Embedded Serial-Ethernet Converter

CSE-M53 User's Manual

Version 2.0

Sollae Systems Co., Ltd.

http://www.ezTCP.com

This symbol, found on your product or on its packaging, indicates that this product should not be treated as household waste when you wish to dispose of it. Instead, it should be handed over to an applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences to the environment and human health, which could otherwise be caused by inappropriate disposal of this product. The recycling of materials will help to conserve natural resources. For more detailed information about the recycling of this product, please contact your local city office, household waste disposal service or the retail store where you purchased this product.

※ This equipment obtained certification by using 1.5M serial cable.

Contents

1 Overview ..... - 5 -

1.1 Overview ..... - 5 -
1.2 Main Features ..... - 5 -
1.3 Application Examples ..... - 6 -
1.4 Components ..... - 7 -
1.5 Specification ..... - 8 -
1.5.1 Hardware ..... - 8 -
1.5.2 Software ..... - 8 -
1.5.3 Demension ..... - 9 -
1.5.4 Pins ..... - 10 -
1.5.5 Voltage Features ..... - 11 -
1.5.6 An Application Circuit ..... - 11 -
1.6 Evaluation Board ..... - 12 -
1.6.1 Parts ..... - 12 -
1.6.2 Demension ..... - 14 -

2 Installation and Test ..... - 15 -

2.1 Installation ..... - 15 -
2.1.1 Setting Network Aera ..... - 15 -
2.2 Simple Test ..... - 17 -

3 Configuration ..... - 20 -

3.1 Configuration with ezManager ..... - 20 -
3.1.1 Configuration via LAN ..... - 20 -
3.1.2 Configuration via Serial ..... - 21 -
3.2 AT command ..... - 22 -

4 Operation Modes ..... - 23 -

4.1 What is the Operation Mode? ..... - 23 -
4.2 How to entering each mode ..... - 23 -
4.3 Comparison with each mode ..... - 24 -
4.4 Normal Mode ..... - 24 -
4.5 Serial Configuration Mode ..... - 25 -
4.6 ISP Mode ..... - 25 -
4.6.1 Upgrading Firmware ..... - 25 -

4.6.2 Revoking Serurity Options - 25 -

5 Communication Modes - 26 -

5.1 TCP Server - 26 -

5.1.1 Key parameters - 26 -

5.1.2 Examples - 27 -

5.2 TCP Client - 30 -

5.2.1 Key parameters - 30 -

5.2.2 Examples - 31 -

5.3 AT Command - 34 -

5.3.1 Key parameters - 34 -

5.3.2 Examples - 35 -

5.4 UDP - 38 -

5.4.1 Key parameters - 38 -

5.4.2 Examples - 39 -

6 System Management - 41 -

6.1 Upgrading Firmware - 41 -

6.1.1 Firmware - 41 -

6.1.2 Processes - 41 -

6.2 Status Monitoring - 43 -

6.2.1 Using TELNET - 43 -

6.2.2 Using ezManager - 45 -

6.2.3 Debugging Message - 47 -

7 Additional Functions - 50 -

7.1 Security - 50 -

7.1.1 Restriction of Access (ezTCP Firewall) - 50 -

7.1.2 Setting Password - 50 -

7.2 Notify IP Change - 51 -

7.3 Sending MAC Address - 52 -

7.4 TELNET COM port Control Option (RFC 2217) - 52 -

8 Self-Test in Trouble - 53 -

8.1 Searching problem with ezManager - 53 -

8.2 Connection Problem over TCP/IP - 54 -

8.3 Data Communication Problem on the Serial - 55 -

9 Related Material - 56 -

9.1 Technical Documents ..... - 56 -
9.2 Smart phone Application ..... - 56 -

10 Technical Support and Warranty ..... - 57 -

10.1 Technical Support ..... - 57 -
10.2 Warranty ..... - 57 -
10.2.1 Refund ..... - 57 -
10.2.2 Free Repair Services ..... - 57 -
10.2.3 Charged Repair Services ..... - 57 -

11 Precaution and Exemption from Liability ..... - 58 -

11.1 Precaution ..... - 58 -
11.2 Exemption from Liability ..... - 59 -
11.2.1 English version ..... - 59 -
11.2.2 French version ..... - 60 -

12 History ..... - 62 -

1 Overview

1.1 Overview

Almost all communication devices including PC are using serial transmission. In this type, devices send and receive data in the order of each byte. The serial communication is quite simple to implement but has weaknesses like short distance and hard maintenance.

CSE-M53 lets the serial devices connect to the Internet. To communicate on the Internet, devices should use TCP/IP protocol, so CSE-M53 processes the converting serial data to TCP/IP.

1.2 Main Features

- Very compact module type : 20mm x 24mm
- High speed UART x 1 (3.3V TTL) available on RS232/RS422/RS485 extension
- Industrial temperature range (-40℃ ~ +85℃)

1.3 Application Examples

- 1:1 Connection with a PC

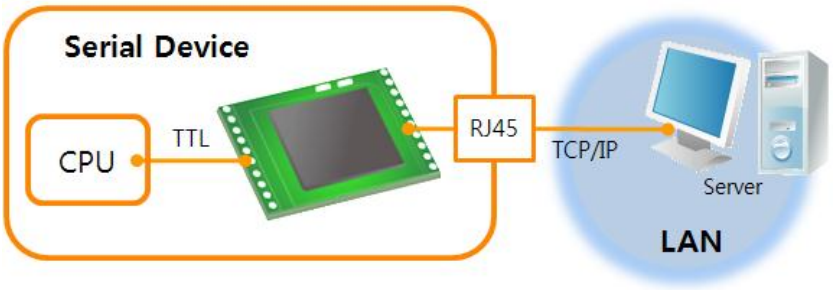

Figure 1-1 1:1 connection with a PC

- Applied to LANs

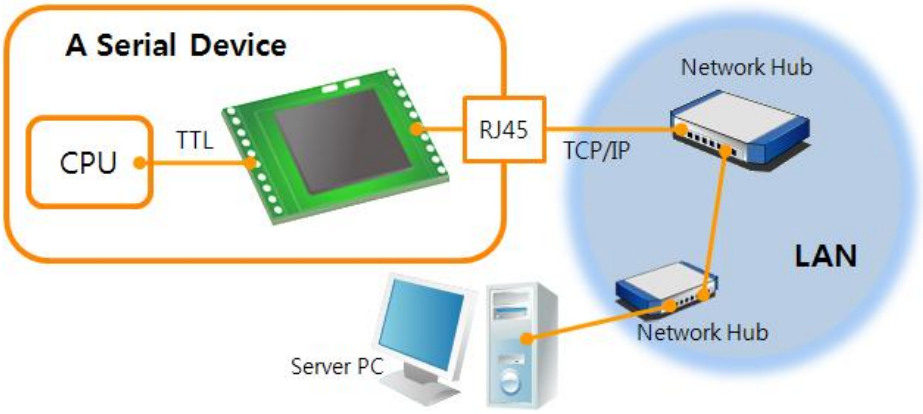

Figure 1-2 applied to LANs

- Applied to the Internet on Cable Networks

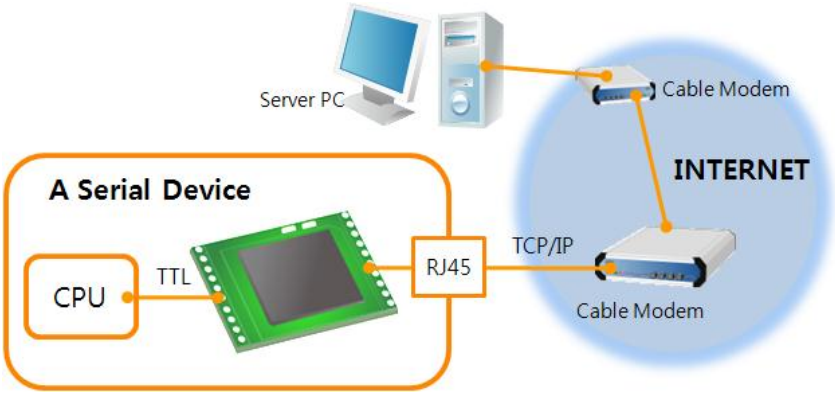

Figure 1-3 applied to the Internet on cable networks

- Applied to the Internet with an IP Share Router

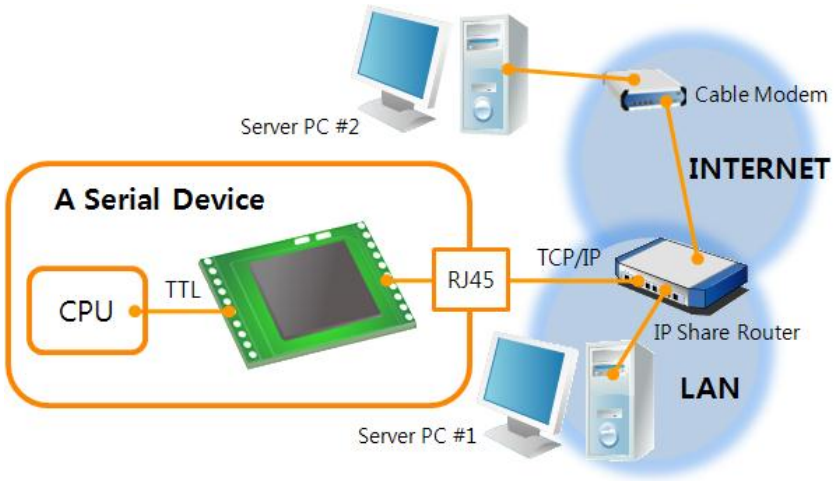

Figure 1-4 applied to the Internet with an IP share router

1.4 Components

- CSE-M53's Body
- Evaluation Board for CSE-M53 (Option)
- RS232 Cross Cable (Option)
- DC 5V Power Adapter (Option)

1.5 Specification

1.5.1 Hardware

Power	Input Voltage	DC 3.3V
	Current	75mA typical
Dimension	24 mm x 20 mm x 9.1mm	
Weight	About 3.2g	
CPU	Cortex-M3 Core	
Interface	Serial Port	RS232 – RTS/CTS and Xon/Xoff Flow Control TTL-3.3V Logic Level (Baud Rate: 300bps ~ 921,600bps)
	Network	10 Base-T or 100 Base-TX Ethernet Auto-Sensing Auto MDI or MDIX cable Auto-Sensing
Temperature	Operating: -20 ~ 70℃, Storage: -40 ~ 85℃	
RoHS	RoHS Compliant	

Table 1-1. Hardware specification

1.5.2 Software

Protocol	TCP, UDP, IP, ICMP, ARP, DHCP, PPPoE, Telnet, DNS Lookup, DDNS, TELNET COM port Control Option (RFC 2217)	
Operation mode	Normal	For Normal Data Communication
	ISP	For Upgrading F/W
	Serial Configuration	For Configuration via Serial
Communication mode	TCP Server	TCP Passive Connection
	TCP Client	TCP Active Connection
	AT Command	TCP Passive / Active Connection
	UDP	UDP – No Connection
Major Utilities	ezManager	Configuration Utility for MS Windows (Supports Downloading F/W)
	ezVSP	Serial to TCP/IP Virtual driver for MS Windows

Table 1-2. Software specification

☞ ***In RS-485 communication or Using Xon/Xoff flow control option, the maximum baud rate is restricted to 230,400 bps.***

1.5.3 Demension

The dimension of CSE-M53 is followed. (Unit: mm)

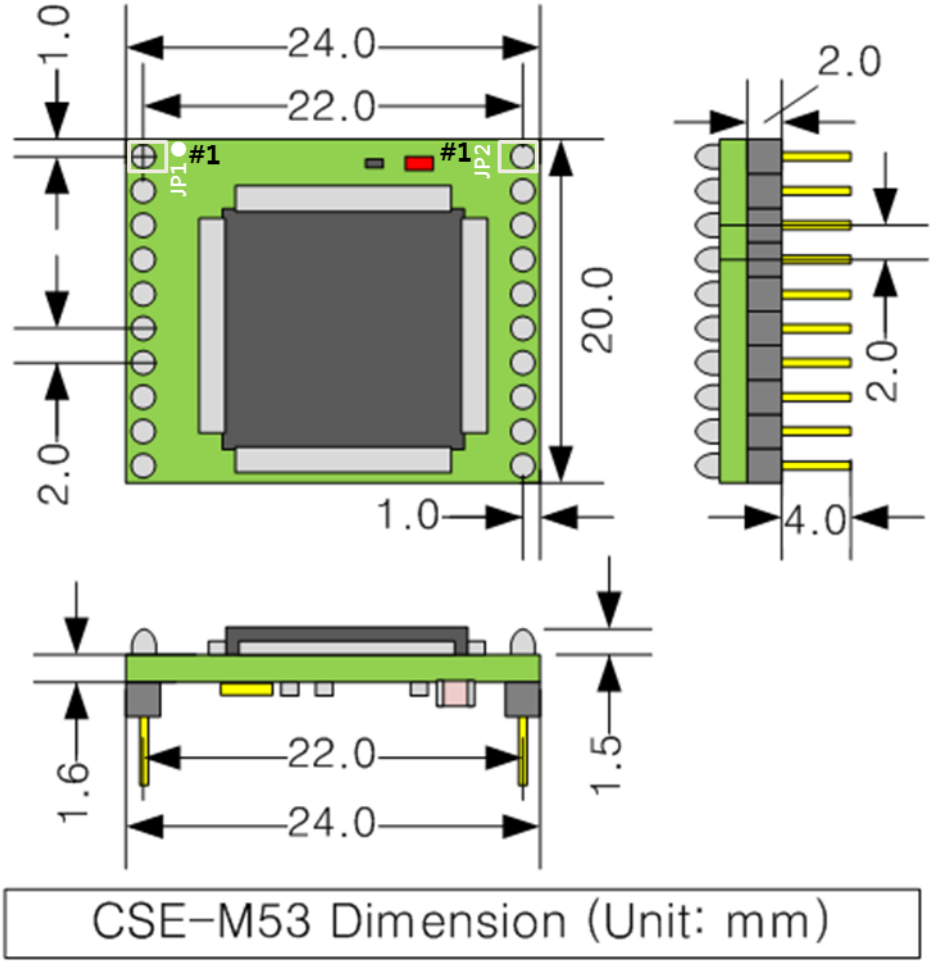

Figure 1-5 dimensions of CSE-M53

1.5.4 Pins

- JP1 / JP2 Connector

  JP1 and JP2 have headers of 2mm pitch. There is a circle by the first pin (pin number 1) of JP1.

JP1	Name	Description	Direction
1	GND	Ground (with a Circle)	-
2	TP_RXN	LAN IN -	Input
3	TP_RXP	LAN IN +	Input
4	GND	Ground	
5	TP_TXN	LAN OUT -	Output
6	TP_TXP	LAN OUT +	Output
7	GND	Ground	-
8	RXD_LED	LAN RECEIVE LED	Output
9	TXD_LED	LAN SEND LED	Output
10	LINK_LED	LINK LED	Output

Table 1-3 JP1

JP2	Name	Description	Direction
1	VDD_3.3V	DC 3.3V volt power (V_{DD})	-
2	RST-	System Reset (Low Active) Valid time for giving Low signal : duration over 1㎳ is recommended	Input
3	ISP-	Changing modes	Input
4	GND	Ground	-
5	RXD	UART IN	Input
6	TXD	UART OUT	Output
7	CTS	UART CTS	Input
8	RTS	UART RTS (Request To Send, – Low), TXDE in RS485 (Sending data – High)	Output
9	TCP	TCP Status LED	Output
10	STS_LED	Status LED	Output

Table 1-4 JP2

1.5.5 Voltage Features

Parameters	Description	Minimum	Typical	Maximum	Unit
V_{DD}	Supplied Voltage	3.0	3.3	3.6	V
V_{IH}	High-level input voltage	2.0	-	5.0	V
V_{IL}	Low-level input voltage	-0.3	-	1.3	V
V_{OH}	High-level output voltage	2.4	-	-	V
V_{OL}	Low-level output voltage	-	-	0.4	V

Table 1-5 voltage features

1.5.6 An Application Circuit

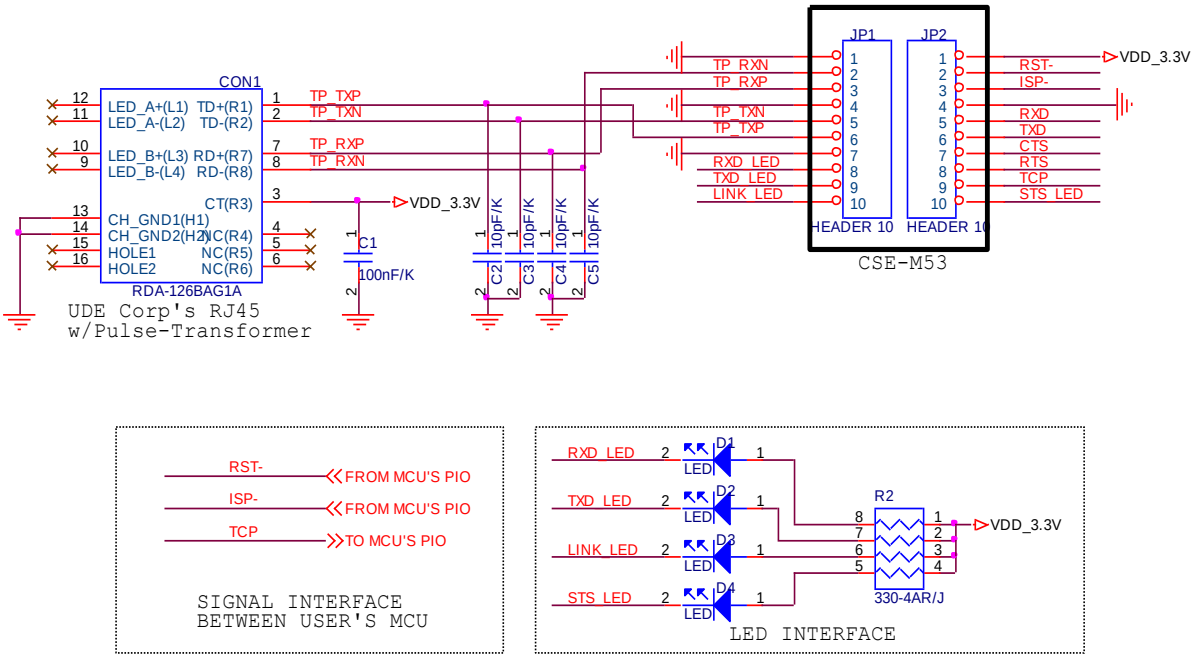

Fig 1-1 an Application Circuit

1.6 Evaluation Board

Evaluation board for CSE-M53 is equipped a RS45 connector and a D-SUB 9 pin Male connector including the 5V DC power connector.

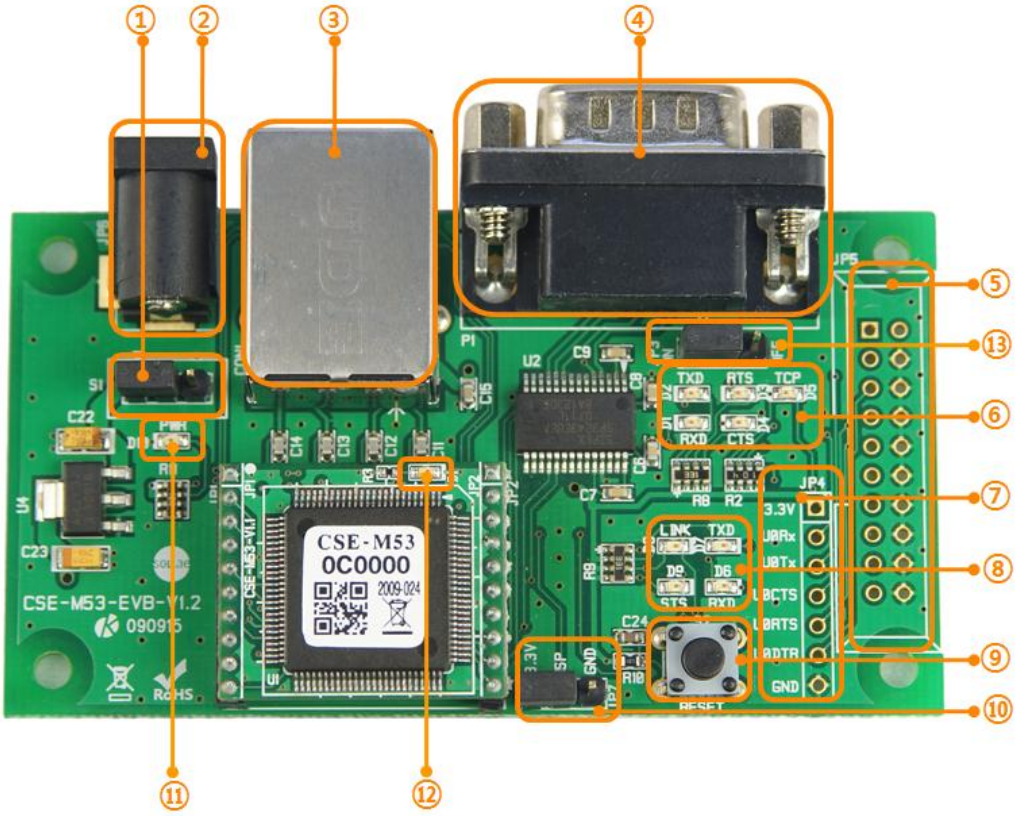

Fig 1-2 EVB for CSE-M53

1.6.1 Parts

① Power Control Jumper: To control supplying the power to the EVB or not.

Division	▽		
Connection	■	■	
Disconnection		■	■

Fig 1-3 power control jumper

② DC Power Connector: Terminal for connecting DC 5V Power

③ RJ45 Connector: Terminal for connecting UTP cable for Ethernet

④ D-SUB 9 Male Connector: Terminal for connecting 9 pin D-SUB connecter for RS-232

⑤ JP5: Only used at the Factory (When producing the product)

⑥ LED Group 1

Name	Color	Description
RXD (D1)	Green	Blinks, when CSE-M53 receives data from the serial port
TXD (D2)		Blinks, when CSE-M53 sends data to the serial port
RTS (D3)		On, when CSE-M53 is available on receiving data
CTS (D4)		On, when CSE-M53 is available on sending data
TCP		On, when CSE-M53 is connected with a remote host on TCP

Table 1-6 LED Group 1

⑦ TTL Port: For 3.3V TTL logic level communication

⑧ LED Group 2

Name	Color	Description
RXD (D6)	Green	Blinks, when CSE-M53 receives data from the Ethernet port
TXD (D7)		Blinks, when CSE-M53 sends data to the Ethernet port
LINK (D8)		On, when CSE-M53 is connected with the Ethernet
STS (D9)		On, when CSE-M53 is connected with a remote host on TCP
		Blinks in every second, when CSE-M53 is in normal mode
		Blinks 4times at once, when any IP addresses have not been assigned to CSE-M53 from DHCP or PPPoE servers

Table 1-7 LED Group 2

⑨ Reset S/W: S/W for re supplying the power to the EVB

⑩ JP7: A port for changing modes

Division	3.3V	ISP	GND
Normal			
ISP			
Serial Configuration		**less than 1 sec**	

Fig 1-4 JP7 for Changing modes

⑪, ⑫ LED Groups 3 and 4

Name	Color	Description
PWR (D10)	Red	On, when the power is supplied to the EVB
D1	Orange	Slowly Blinks, when the power is supplied to the CSE-M53
		Shortly Blinks, when the CSE-M53 is operates in ISP mode

Table 1-8 LED Groups 3 and 4

⑬ JP3: A port for enabling or disabling outputs of RS232 line driver (Disable this port when using TTL level)

1.6.2 Demension

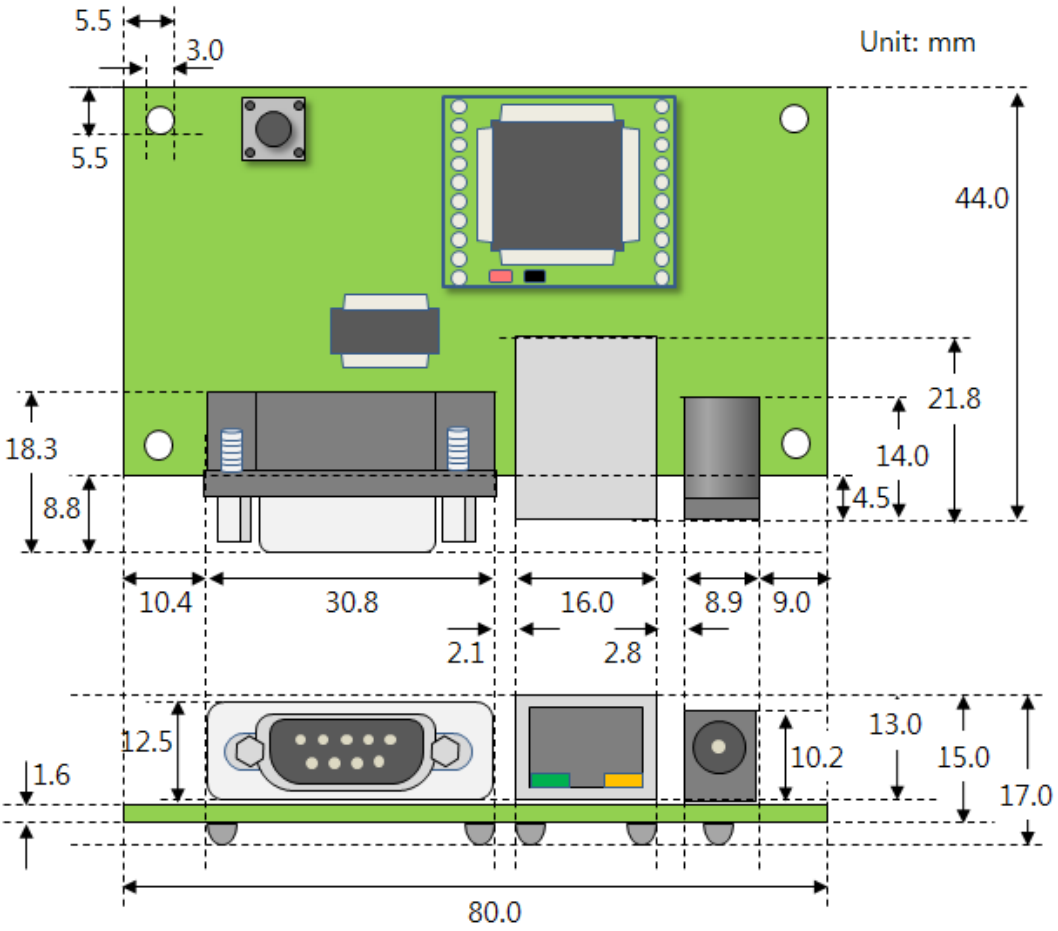

Figure 1-6 Dimension of evaluation board

☞ ***According to conditions of soldering components, the dimensions might be differed with the above figure. Thus, we recommend giving some extra spaces about 1 ~ 2 mm.***

2 Installation and Test

2.1 Installation

Before testing CSE-M53, users should connect both serial and Ethernet port to a PC. It will be no problem that the Ethernet connection includes network hubs. In this document, whole processes are written assume that using it with evaluation board.

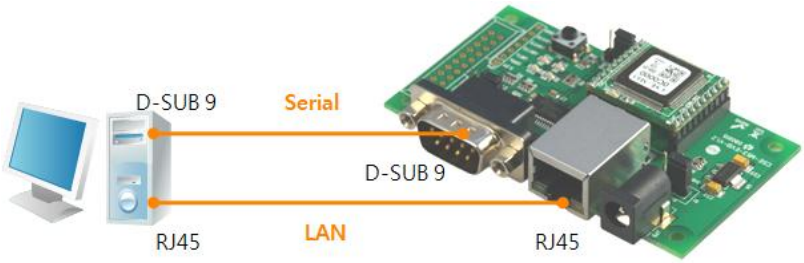

Figure 2-1 connection between CSE-M53 and a PC

Procedures for the test are followed.

2.1.1 Setting Network Aera

This step is for setting both CSE-M53 and users' PC to be located the same network. If only they are, the TCP connection between them can be established.

- Setting of the PC

  Add or change the IP address of the network adapter on your PC like following.

  Get into the menu of [Windows Control Panel] >> [Network Connections] >> [Properties of the Network Adapter – with right click of your mouse]. Then, you can show the properties of [Internet Protocol (TCP/IP). In there, press the [Advanced..] button for adding an IP Address like the below figure.

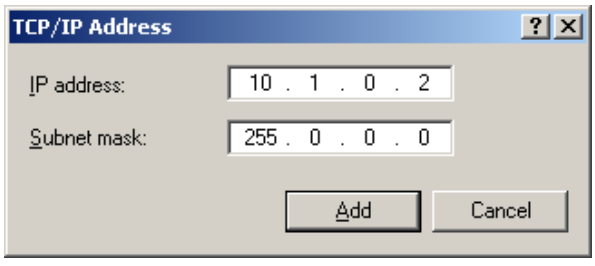

Figure 2-2 adding / changing the IP address of users' PC

- Setting of CSE-M53

  CSE-M53 uses ezManager as it's a configuration program. ezManager is for MS Windows, and this is comfortable to use because it doesn't need installation.

  First, search your CSE-M53 via network. All the values of parameters are set the default values in the factory. To apply it to your system, proper values should be set via ezManager.

  Major parameters' default values are listed on below table. To implement this simple test, keep these values without any changes.

Name		Default Values
Network	Local IP Address	10.1.0.1
	Subnet Mask	255.0.0.0
Option	TELNET	Checked
	IP Address Search	Checked
Serial Port (COM1)	Serial Type	RS232
	Baud Rate	19,200bps
	Parity	NONE
	Data Bits	8
	Stop Bit	1
	Flow Control	NONE
	Communication mode	TCP Server
	Local Port	1470

Table 2-1 default values of Major parameters

☞ ***Users can download the latest version of ezManager on the [Download] >> [Utilities] menu of our website.***

☞ ***Detail manners of the configuration are explained on the "3.1 Configuration with ezManager".***

2.2 Simple Test

If you press the [Simple Test] button, test program will be shown on your screen.

- Connecting to the CSE-M53 via LAN

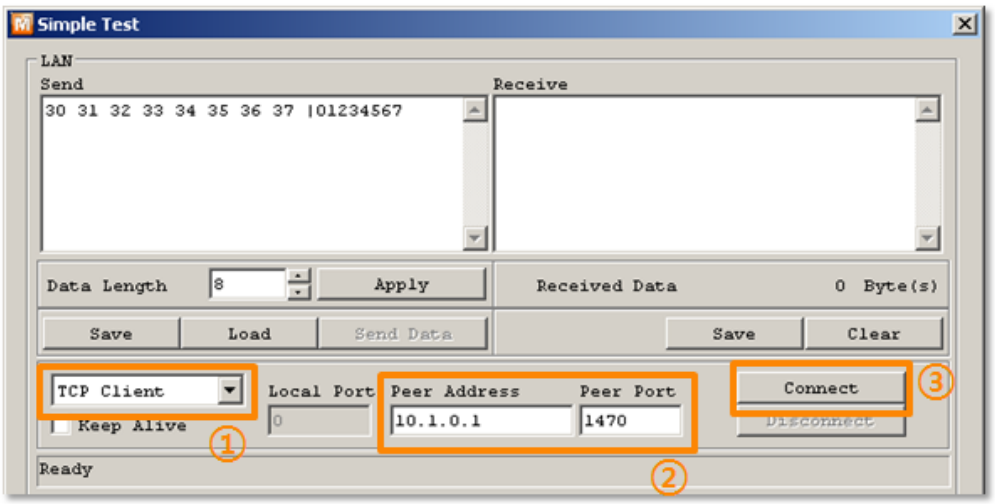

Figure 2-3 settings for TCP connection

① Select [TCP Client]

② Input correct IP address and port number of CSE-M53

③ Clink the [Connect] button. (In case of TCP Server, it will be [Listen] button)

- Opening RS232 Port

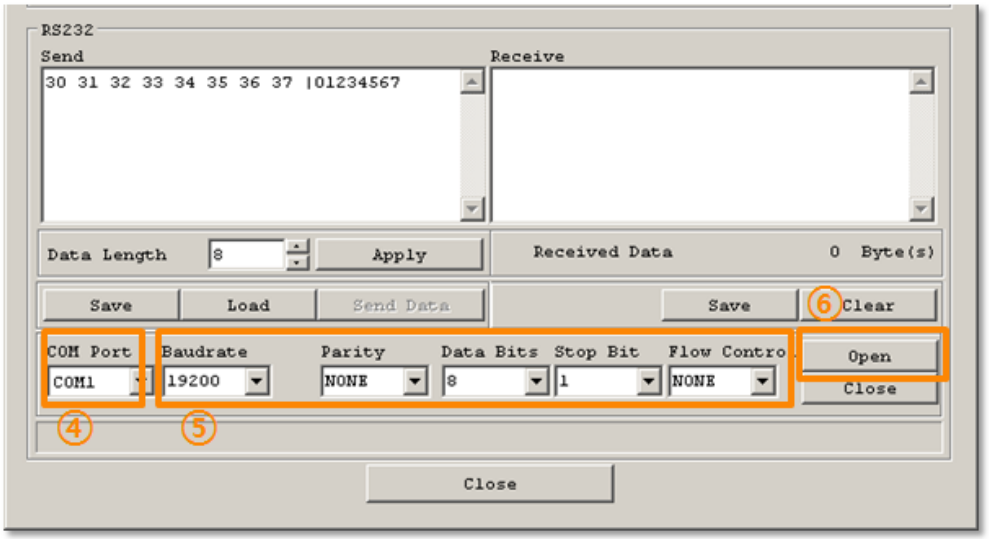

Figure 2-4 opening COM Port

④ Select COM port which the CSE-M53 is connected to

⑤ Make sure that all the parameters are the same with CSE-M53

⑥ Press the [Open] button

- Confirm the TCP Connection and COM port status

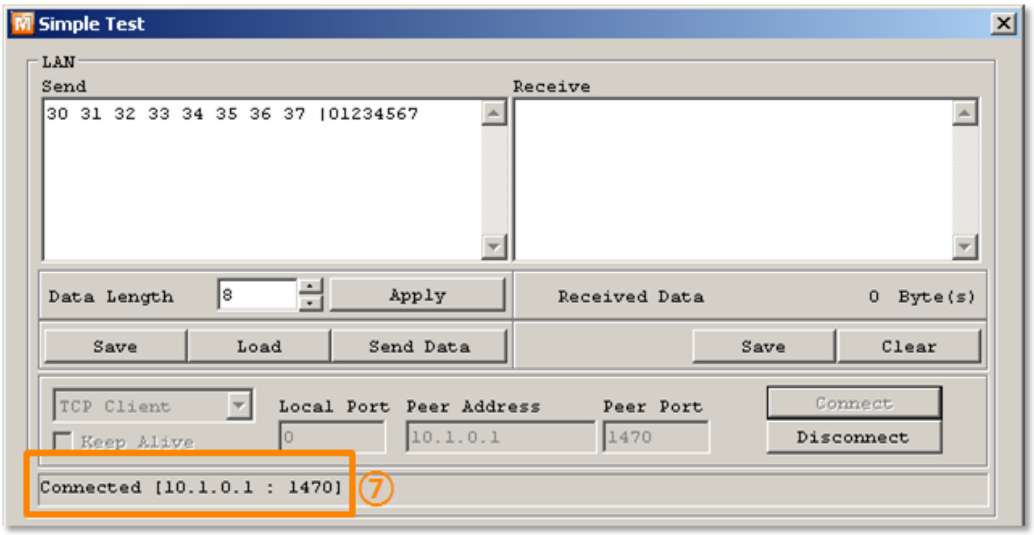

Figure 2-5 TCP Connected message

⑦ Check the message if the TCP connection is established

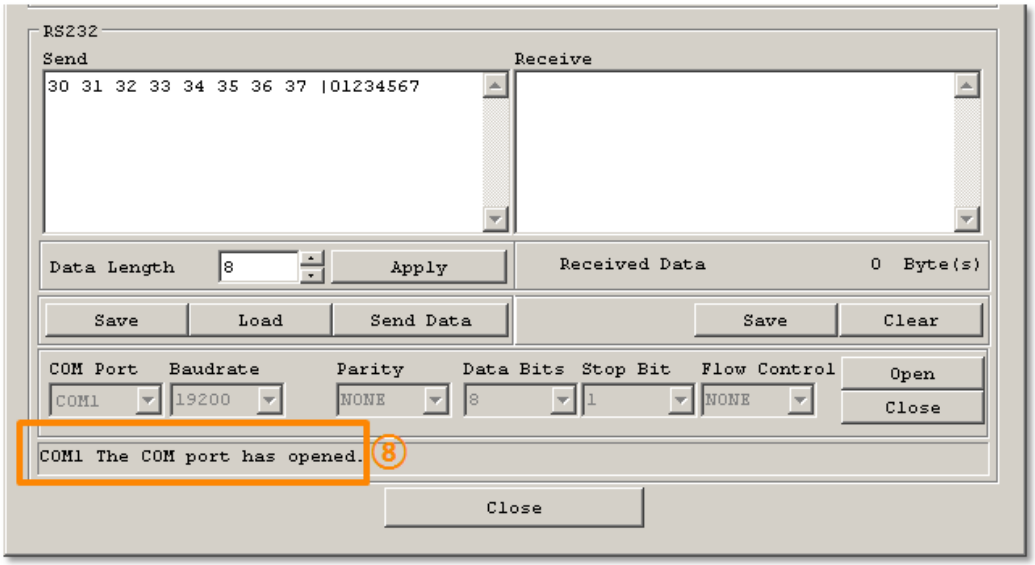

Figure 2-6 COM Port open message

⑧ Check the message if the COM port has been opened

- Data transmission test

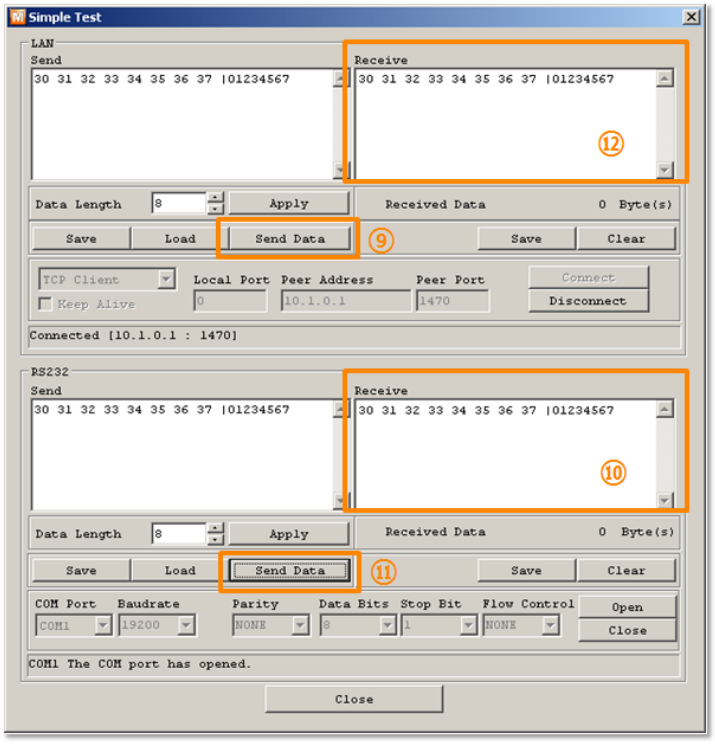

Figure 2-7 successful data transmission

⑨ Click the [Send data] on the LAN part

⑩ Check the data have been shown from the step ⑨

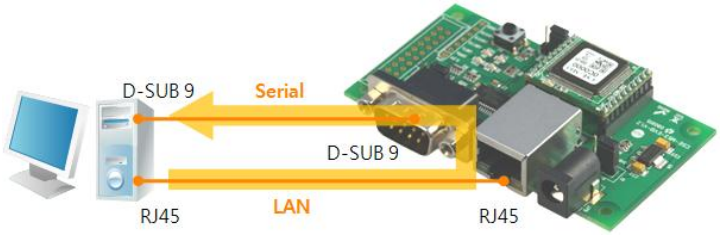

Figure 2-8 LAN → RS232

⑪ Press the [Send data] on the RS232 part

⑫ Check the data have been received from the step ⑪

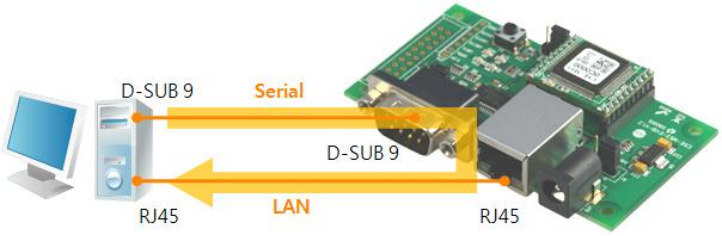

Figure 2-9 RS232 → LAN

3 Configuration

3.1 Configuration with ezManager

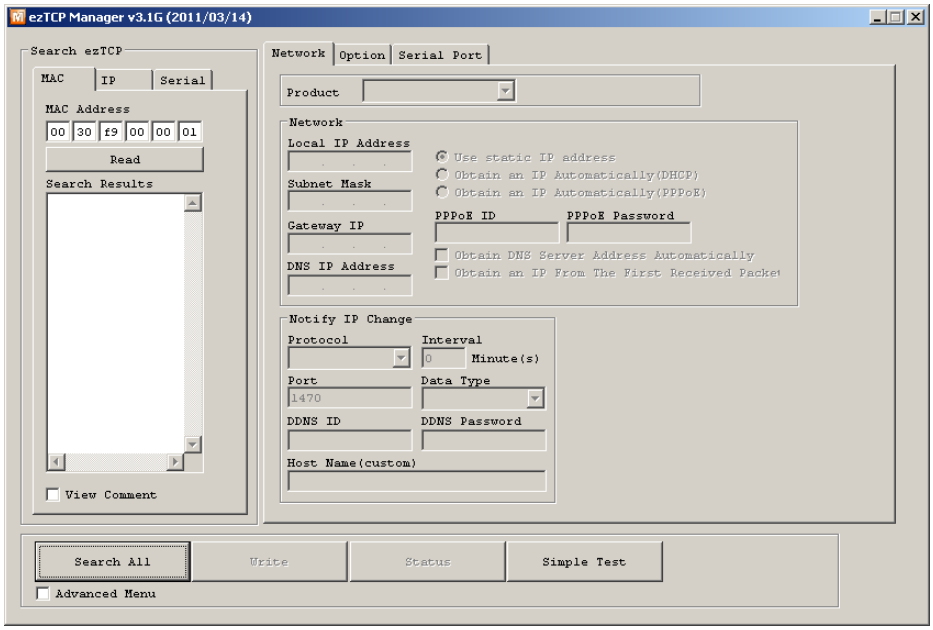

Figure 3-1 initial appearance of ezManager

3.1.1 Configuration via LAN

- Checklists

  Make sure the connection between your PC and CSE-M53. If they are the same network, [MAC Address search] button can be used. If they aren't, only [IP Address search] is allowed to use.

- Procedures

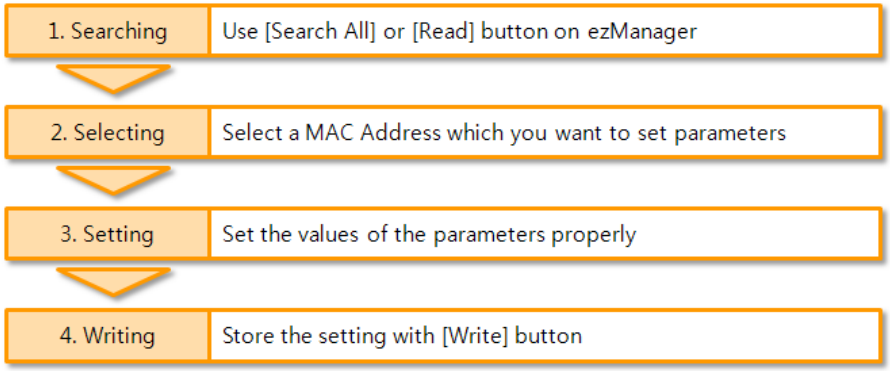
1. Searching
Use [Search All] or [Read] button on ezManager
2. Selecting
Select a MAC Address which you want to set parameters
3. Setting
Set the values of the parameters properly
4. Writing
Store the setting with [Write] button

Figure 3-2 procedures for configuration via LAN

3.1.2 Configuration via Serial

- Checklists

  Make sure the connection between your PC and CSE-M53 using RS232 cross cable. To use this, CSE-M53 has to be operating in the [Serial Configuration] mode. By connecting ISP- pin with GND (LOW) less than 1 second, you can enter the mode. After this, read the setting via [Serial] tab on ezManager.

- Procedures

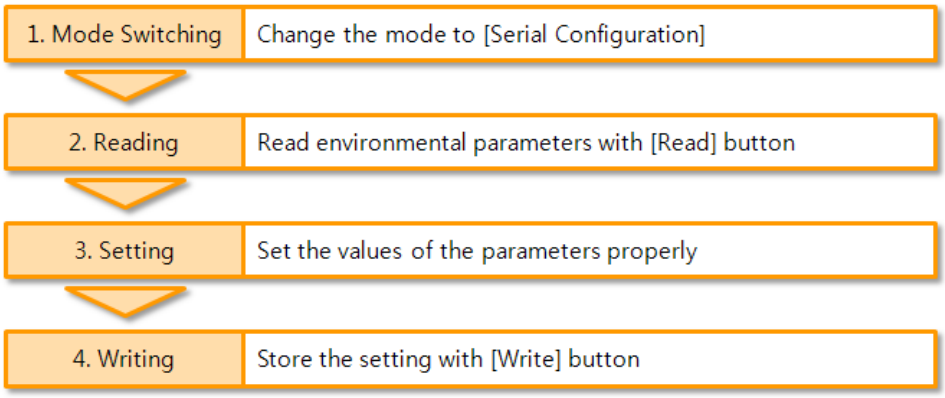
1. Mode Switching
Change the mode to [Serial Configuration]
2. Reading
Read environmental parameters with [Read] button
3. Setting
Set the values of the parameters properly
4. Writing
Store the setting with [Write] button

Figure 3-3 procedures for configuration via Serial

- Step 2, Reading

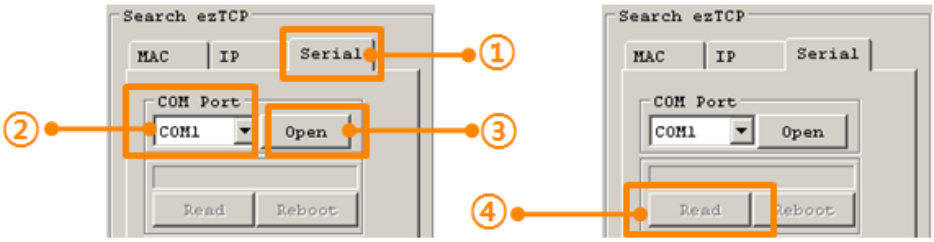

Figure 3-4 reading procedure via serial

② Choose the [Serial] tab

② Select the COM port which the CSE-M53 is connected with

③ Open the COM port with the [Open] button

④ Load the setting with [Read] button

☞ ***If you want to know more specific manners of setting, please refer to the document "ezManager Users' Manual" on the [Download] >> [Technical Document] of our website.***

3.2 AT command

In the AT command mode, you can change some parameters through the serial port.

- Checklists

  Make sure the connection between your PC and CSE-M53 using RS232 cross cable. To use this, CSE-M53 has to be set to [AT command] mode as its communication mode. This can be configured by ezManager.

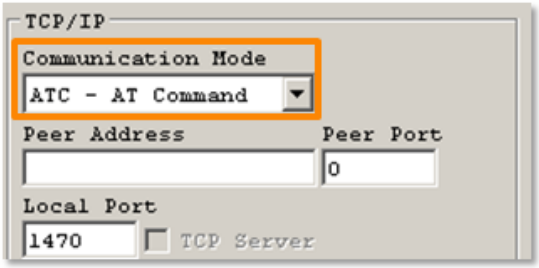

Figure 3-5 setting the communication mode to the AT command

- Procedures

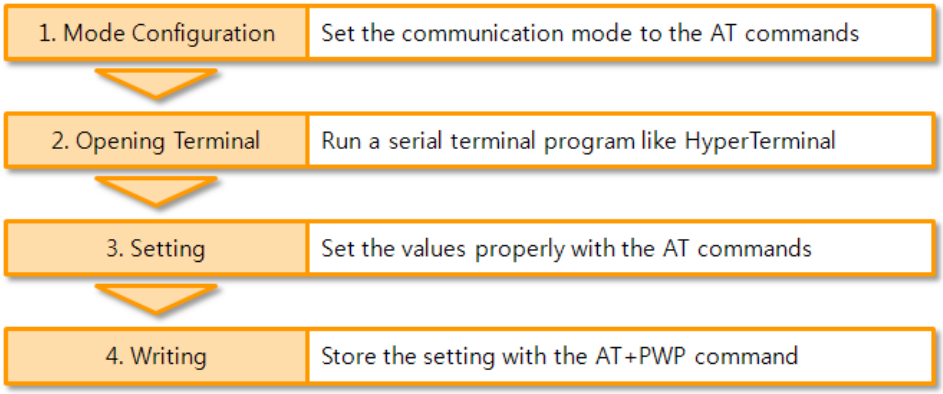
1. Mode Configuration
Set the communication mode to the AT commands
2. Opening Terminal
Run a serial terminal program like HyperTerminal
3. Setting
Set the values properly with the AT commands
4. Writing
Store the setting with the AT+PWP command

Figure 3-6 procedures for configuration with AT command

Division	Available parameters
IP Address related items	Local IP Address, DHCP, PPPoE, Subnet Mask, Gateway IP Address, DNS IP Address, …
TCP connection related items	Local Port, Peer Address (IP Address or Host name), Peer Port, …
Option	ESC code sending option, timeout, …

Table 3-1 parameters which are available to change with AT command

☞ ***Including above items, rest of parameters can be set by ezManager***

4 Operation Modes

4.1 What is the Operation Mode?

Each of three operation mode of CSE-M53 is defined for specific purpose, and those are followed.

- Normal mode
  This mode is for normal data communication and has 4 different connection modes. Configuring parameters is also available in this mode.
- Serial configuration mode
  This mode is for configuring environmental parameters through the RS-232 port.
- ISP mode
  This mode is for upgrading firmware. In addition, you can set environmental parameters even though the security options like password are activated by entering this mode.

4.2 How to entering each mode

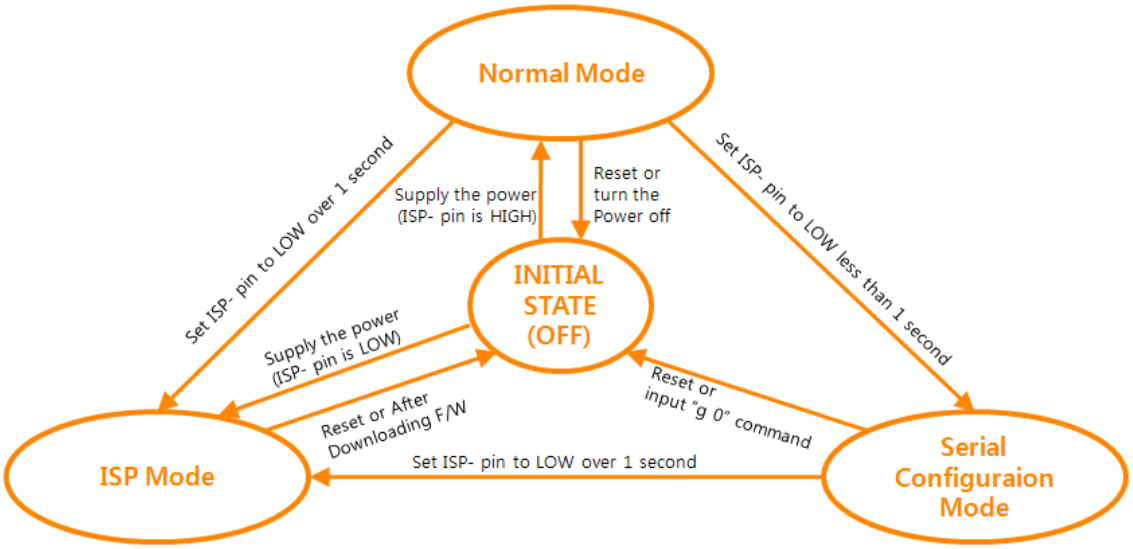
Normal Mode
Supply the power (ISP- pin is HIGH)
Reset or turn the Power off
Set ISP- pin to LOW over 1 second
Set ISP- pin to LOW less than 1 second
INITIAL STATE (OFF)
Supply the power (ISP- pin is LOW)
Reset or After Downloading F/W
Reset or input "g 0" command
Set ISP- pin to LOW over 1 second
ISP Mode
Serial Configuraion Mode

Figure 4-1 How to entering each mode

☞ ***Because the ISP(-) pin is basically pulled up, it keeps HIGH, as long as you don't input 0 volt (LOW)***

4.3 Comparison with each mode

Table 4-1 shows summaries of each mode

Name	Entering	Serial port
Normal	Supplying the power when the status of ISP(-) pin is HIGH	changeable
Serial Configuration	Giving LOW to the ISP(-) pin between 10ms and 1s	115200/N/8/1
ISP	Supplying the power when the status of ISP(-) pin is LOW / Giving LOW to the pin over 1s	115200/N/8/1

Table 4-1 Comparison with each mode

4.4 Normal Mode

In normal mode, there are four connection types to communication with a remote host.

- TCP Server
- TCP Client
- AT Command
- UDP

Name	Protocol	Connection	Modifying software of serial devices	Serial configuration	Topology
TCP Server	TCP	Passive	-	N/A	1:1
TCP Client		Active	-	N/A	1:1
AT Command		Either	Required	Available	1:1
UDP	UDP	-	-	N/A	N:M

Table 4-2 Comparison with four communication modes

TCP is a type of protocol, which has a process of connection. The connection has to be one to one. The part who tries to make the connection is called TCP Client, and the other part is TCP Server. On the other hand, UDP has no connection process. Because of this, each of them can be send and receive data from multiple hosts.

4.5 Serial Configuration Mode

This is a mode for setting environmental parameters through RS232 port. If you can't use the Ethernet, this mode is only way to configure the values. Once entering this mode, use the [Read] button on the [Serial] tab of ezManager. (Figure 3-4)

4.6 ISP Mode

You can enter this mode by pressing the ISP button over 1 second. There are two special purposes in this mode.

4.6.1 Upgrading Firmware

ISP mode is for upgrading firmware which is offered by us. The upgrade is implemented on Ethernet.

☞ ***The details are followed in the "6.1 Upgrading Firmware".***

4.6.2 Revoking Serurity Options

CSE-M53 offers restriction methods for security like filtering password or MAC and IP address. In the ISP mode, you can revoke all of these. When you forgot the password, enter the ISP mode to solve the problem.

5 Communication Modes

5.1 TCP Server

In this mode, CSE-M53 functions as a TCP server. CSE-M53 listens to a TCP connection from remote host. Once a host tries to connect to CSE-M53, it responses that request. After the connection is established, CSE-M53 converts the raw data from the serial port to TCP/IP data and sends them to the network and vice versa.

5.1.1 Key parameters

- Local Port

  This is a server's port number which is used in the TCP connection.

- Event Byte

  With setting event bytes, users can handle the serial data before a TCP connection is established.

Value	Description
0	CSE-M53 doesn't send the data
Otherwise (512 or under)	CSE-M53 sends the data right after a connection is established. 512 or under bytes are strongly recommended.

Table 5-1 Event Byte

- Timeout

  If there is no transmission of data for amount of time which is set to this parameter, CSE-M53 tries to terminate established TCP connection.

- Notify IP Change

  This function is for notifying information about changed IP address to a server. Not only the TCP/UDP protocol but Dynamic Domain Name Service (DDNS) can be used.

- Restriction of Access

  Users can block TCP connections from unauthorized hosts by using this option. Both IP and MAC address are available.

5.1.2 Examples

- A situation that [Event Byte] is set to 0.

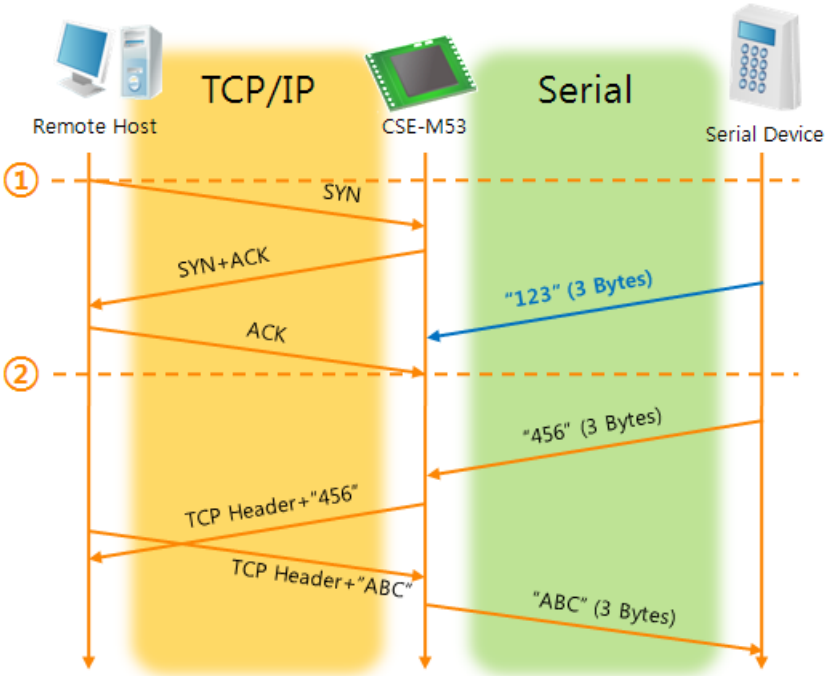

Figure 5-1 time chart for a situation that [Event Byte] is set to zero

Points	States
~	CSE-M53 is listening to connection requests
①	Remote host has sent a connection request (SYN) segment
~	Processes of the connection
②	The connection has been established
~	Data communication on both sides

Table 5-2 states of each points

Look at the blue arrow. The data "123" from the serial port had sent before the connection is established. In this case, the data wasn't sent because of the [Event Byte] is set to 0.

- A situation that [Event Byte] is set to 1.

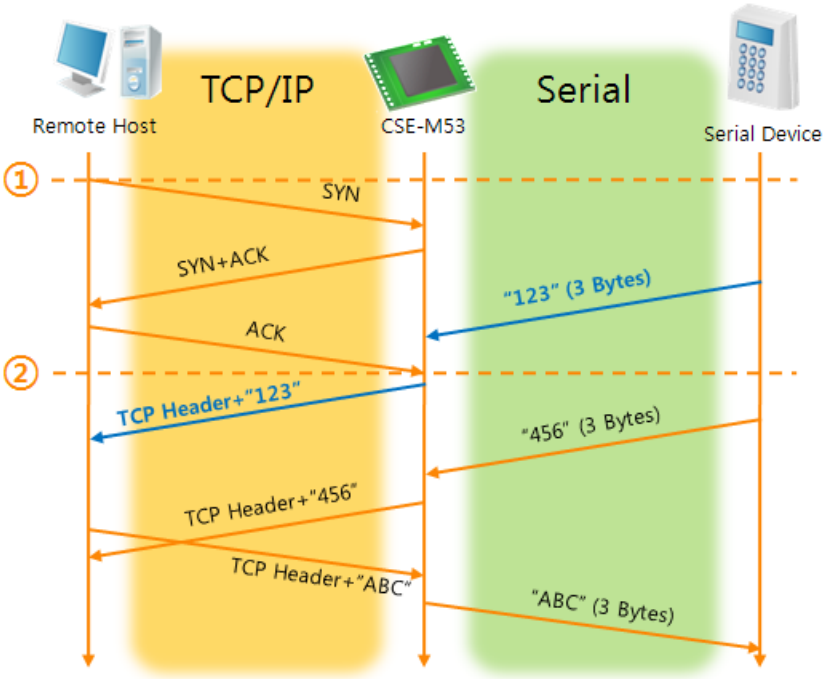

Figure 5-2 time chart for a situation that [Event Byte] is set to 1

Points	States
~	CSE-M53 is listening to connection requests
①	Remote host has sent a connection request (SYN) segment
~	Processes of the connection
②	The connection has been established
~	The data "123" has been sent right after the end of connection processes

Table 5-3 states of each points

As you can see, the data "123" has been sent right after the connection is established because the value of [Event Byte] had been set to 1. If the value is not 0, the result is the same as above example.

- A situation that [Timeout] is set to 5.

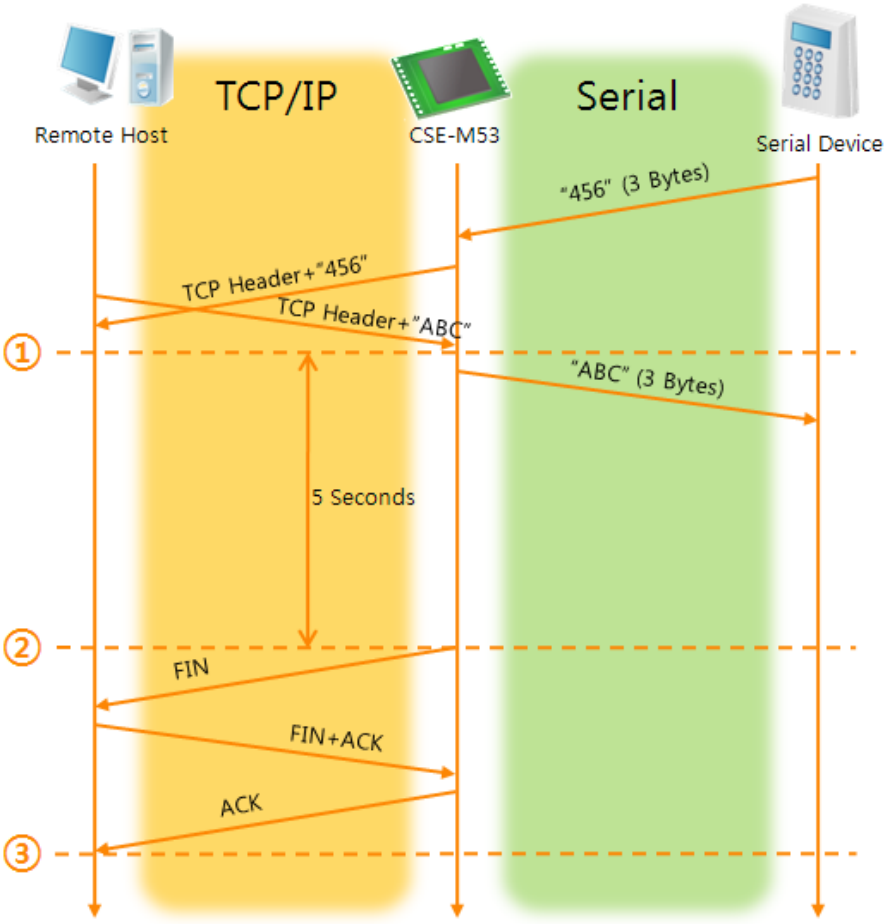

Figure 5-3 time chart for a situation that [Timeout] is set to 5

Points	States
~	Data communication on both sides
①	The last segment has been arrived at the CSE-M53
~	5 seconds are passed with no data communication
②	CSE-M53 has sent disconnection request (FIN) to a remote host
~	Processes of the disconnection
③	The connection has been terminated
~	CSE-M53 is listening to connection requests

Table 5-4 states of each points

5.2 TCP Client

In this mode, CSE-M53 functions as a TCP client. CSE-M53 sends request segments to a remote host with information of [Peer Address] and [Peer Port]. Once a host is listening and works correctly, the connection will be established. After then, CSE-M53 converts the raw data from the serial port to TCP/IP data and sends them to the network and vice versa.

5.2.1 Key parameters

- Peer Address

  This item should be an address of a remote host who is listening TCP connections.

- Peer Port

  [Peer Port] should be the port number which is designated by the remote host.

- Event Byte

  CSE-M53 decides the time to send the connection request frame with this parameter.

Value	Description
0	Right after CSE-M53 boots up
Otherwise (512 or under)	right after the bytes set to [Event Byte] have been received from the serial port Setting to less than 512 bytes is strongly recommended.

Table 5-5 the operation of Event Byte 1

In addition, users can handle the serial data before a TCP connection is established with this parameter.

Value	Description
0	CSE-M53 doesn't send the data
Otherwise (512 or under)	CSE-M53 sends the data right after a connection is established. Setting to less than 512 bytes is strongly recommended.

Table 5-6 the operation of Event Byte 2

- Timeout

  If there is no transmission of data for amount of time which is set to this parameter, CSE-M53 tries to terminate established TCP connection.

- TCP Server

  This check option is enable the TCP server / client mode. In this mode, CSE-M53 can be operated as a TCP server or client without changing its setting.

- DNS IP Address

  [DNS IP Address] needs when users use host name instead of the IP address.

5.2.2 Examples

- A situation that [Event Byte] is set to 0.

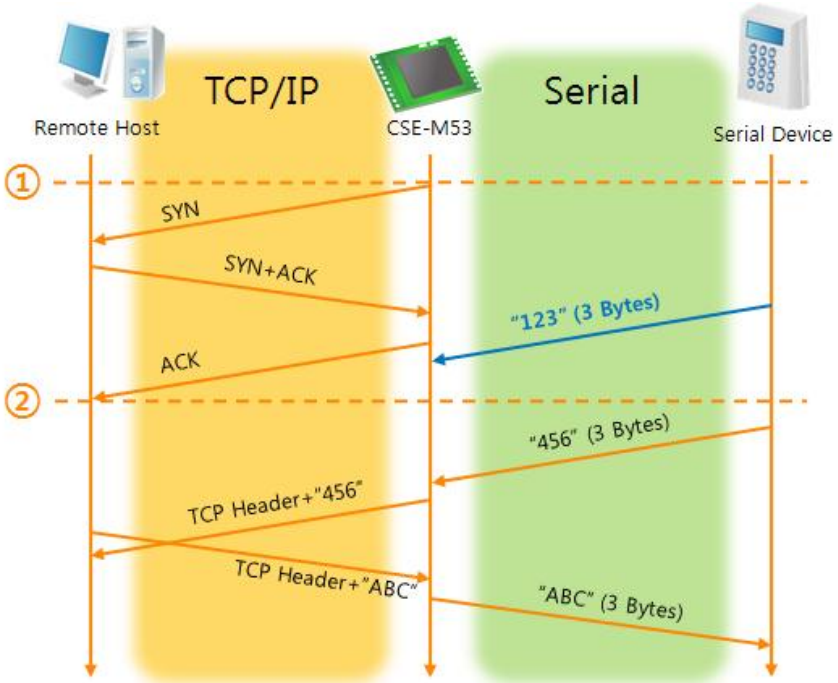

Figure 5-4 time chart for a situation that [Event Byte] is set to 0

Points	States
~	Before the power is supplied
①	Sends TCP connection request segment right after it boots up
~	Processes of the disconnection
②	The connection has been established
~	Data communication on both sides

Table 5-7 states of each points

Look at the blue arrow. The data "123" from the serial port had sent before the connection is established. In this case, the data wasn't sent because of the [Event Byte] is set to 0

- A situation that [Event Byte] is set to 5.

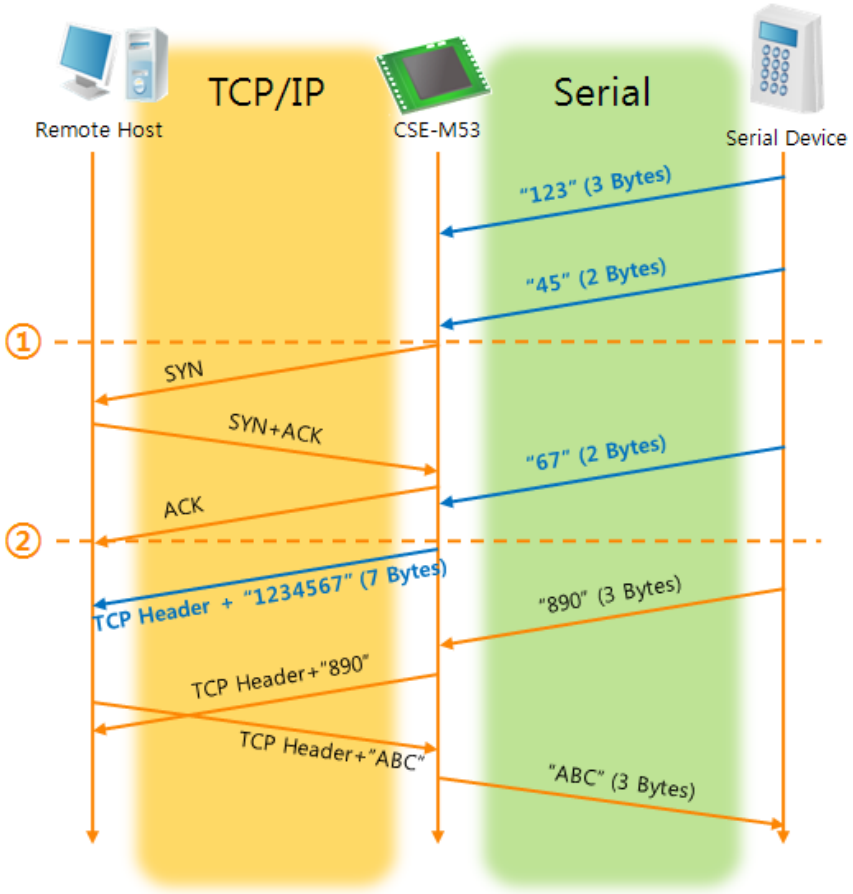

Figure 5-5 time chart for a situation that [Event Byte] is set to 5

Points	States
~	CSE-M53 has receives data from its serial port until the amount of data is 5 bytes
①	Sends connection request segment right after receiving 5 bytes.
~	Processes of the TCP connection
②	The connection has been established
~	The "1234567" is transmitted to the remote host

Table 5-8 states of each points

As you can see in the figure 5-5, CSE-M53 sends request segment right after the serial data had been 5 bytes. Even though those are come before the connection is established, the data "123", "45" and "67" are transmitted to the remote host because of the [Event Byte] is set to 5.

- An activated [TCP Server] option

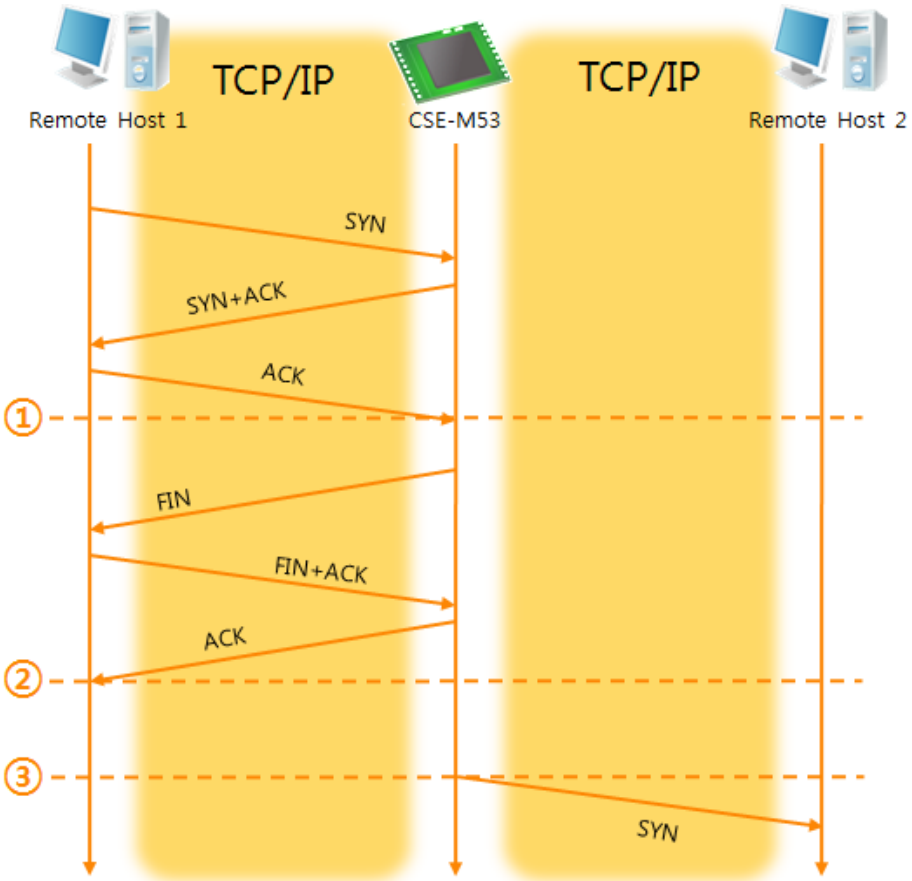

Figure 5-6 time chart for activating [TCP Server] option

Points	States
~	CSE-M53 is listening to connection requests
①	The connection has been established
~	CSE-M53 is on line and processes of the disconnection
②	The connection has been terminated
~	Both sides are offline
③	Sends TCP connection request segment

Table 5-9 states of each points

The TCP Server / Client mode can be useful option by using [Event Byte] and [Timeout]. Note that only one TCP connection can be established at the same time, so users should consider setting [Timeout] properly.

5.3 AT Command

AT command is a mode which users control CSE-M53 with AT command like controlling modem. In this mode, active and passive TCP connections are available. And users are allowed to configure some environmental parameters with extended commands.

5.3.1 Key parameters

The configuration should be implemented via the serial port of CSE-M53

Commands	Description	Examples
+PLIP	Local IP Address	AT+PLIP=10.1.0.1<CR>
+PLP	Local Port	AT+PLP=1470<CR>
+PRIP	Peer IP Address	AT+PRIP=10.1.0.2<CR>
+PRP	Peer Port	AT+PRP=1470<CR>
+PDC	DHCP	AT+PDC=1 (ON)<CR>
+PPE	PPPoE	AT+PPE=1 (ON)<CR>
+PTO	Timeout	AT+PTO=10<CR>
+PWP	Store setting	AT+PWP<CR>

Table 5-10 some of extended commands for configuration

- Related items with IP Address and Local Port
  Local port can be set as well as IP address related parameters like IP Address, Subnet Mask and Gateway IP Address.
- Peer Address / Peer Port
  IP address and local port of a remote host are can be set.
- Type of assigning IP address: Manual, DHCP, PPPoE
  Not only manual setting, also automatic assigning protocol (DHCP, PPPoE) are available.
- Others
  Some of options including [Timeout] can be configured in this mode.

5.3.2 Examples

- TCP Server – setting parameters and passive connection

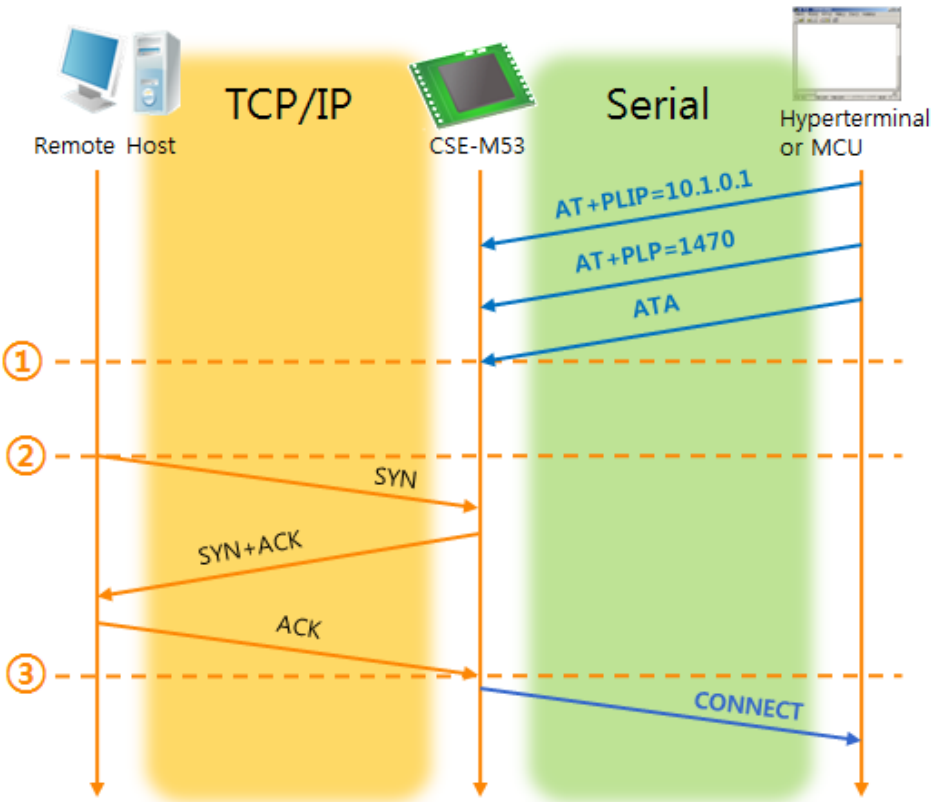

Figure 5-7 TCP passive connection

Points	States
~	Set parameters in the AT command mode
①	CSE-M53 listens TCP connection requests with the ATA command
~	CSE-M53 is listening TCP connection requests
②	A remote host has sent SYN segment to CSE-M53
~	Processes of TCP connection
③	TCP connection has been established
~	CSE-M53 sends "CONNECT" message to the serial port

Table 5-11 states of each points

☞ ***Most of the response messages from the serial port of CSE-M53 are omitted on above figure.***

- TCP Client – setting parameters and active connection

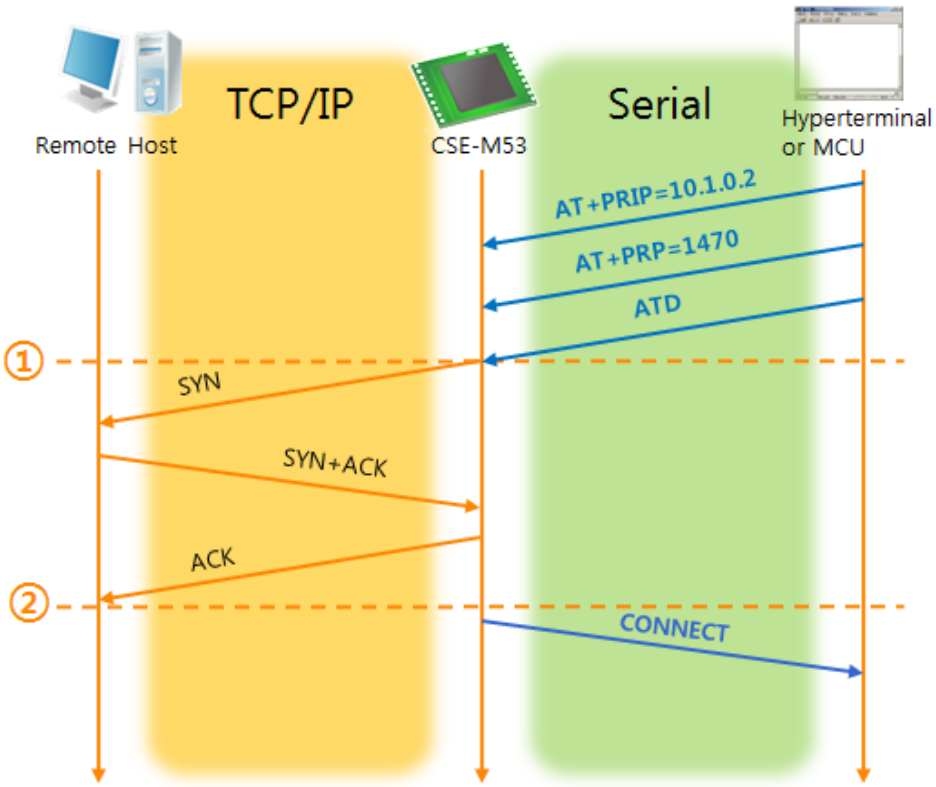

Figure 5-8 TCP Active connection

Points	States
~	Set parameters in the AT command mode
①	CSE-M53 sends a TCP connection request with the ATD command
~	Processes of TCP connection
②	TCP connection has been established
~	CSE-M53 sends “CONNECT” message to the serial port

Table 5-12 states of each points

- Termination of online status – entering the AT command mode

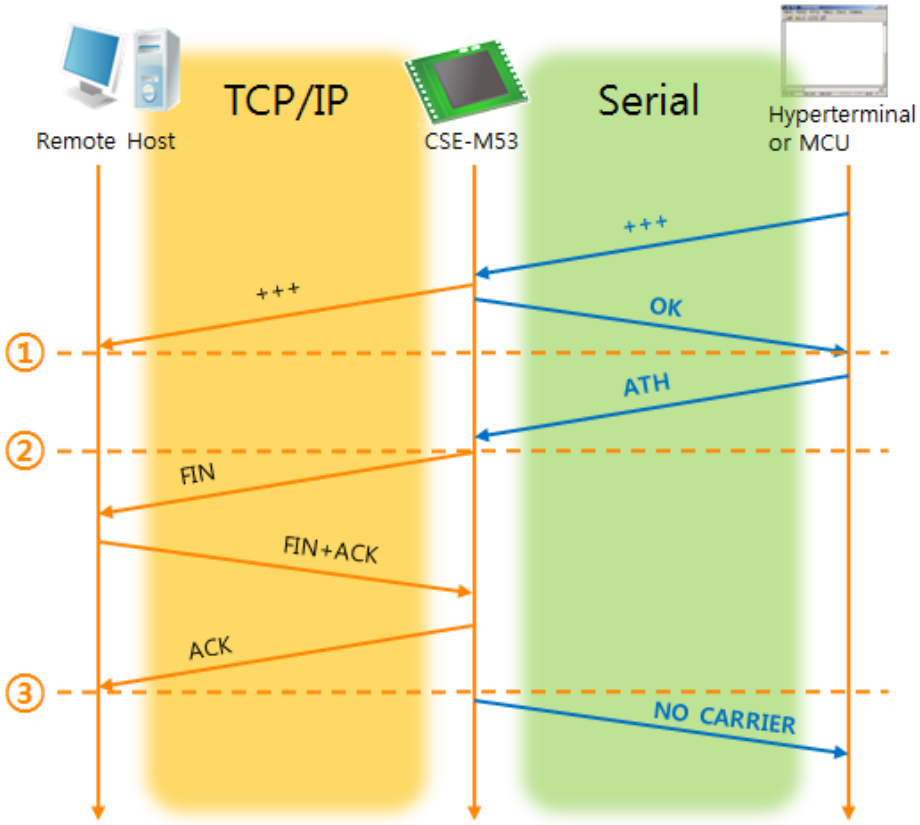

Figure 5-9 Termination of online status

Points	States
~	Keeps TCP connection
①	CSE-M53 enters the AT command mode with receiving "+++"
~	Keeps AC command mode
②	CSE-M53 terminates TCP connection with ATH command
~	Processes of TCP disconnection
③	TCP connection has been terminated
~	CSE-M53 sends "NO CARRIER" with disconnection

Table 5-13 states of each points

CSE-M53 changes the mode to AT command, when receiving "+++" and sending "OK" message. In this state, the communication with remote host is not possible because CSE-M53 processes only AT command. Whenever you want to go back to online state (TCP connection), use "ATO" command.

☞ ***For more information about this, please refer to the "ATC mode" on the [Download] >> [Technical Document] menu of our web site.***

5.4 UDP

UDP has no processes of connection. In this mode, data is sent in block units. Therefore, data that comes through CSE-M53's serial port must be classified in block units to send it elsewhere.

5.4.1 Key parameters

- Block Size(Byte)

  [Block Size(Byte)] means the size of a block in UDP mode. Its unit is byte. The size of bytes are come into the serial port, CSE-M53 sends them as one block to the network. The maximum value could be 1,460 bytes.

- Data Frame

  [Data Frame] means the time for gathering data to make one block. Its unit is 10ms. If there are no transmission during the time which is set to this value, CSE-M53 sends gathered data in the buffer as one block to the network.

☞ ***Once one of the parameters is sufficient, the block size is decided as the condition.***

- Dynamic update of Peer host

  If users set the value of [Peer Address] and [Peer Port] to 0, [dynamic update of peer host] function is activated. By using this function, CSE-M53 can communicate to multiple hosts without additional setting.

5.4.2 Examples

- Block Size: 5 bytes / Data Frame: 1s (100 by 10ms)

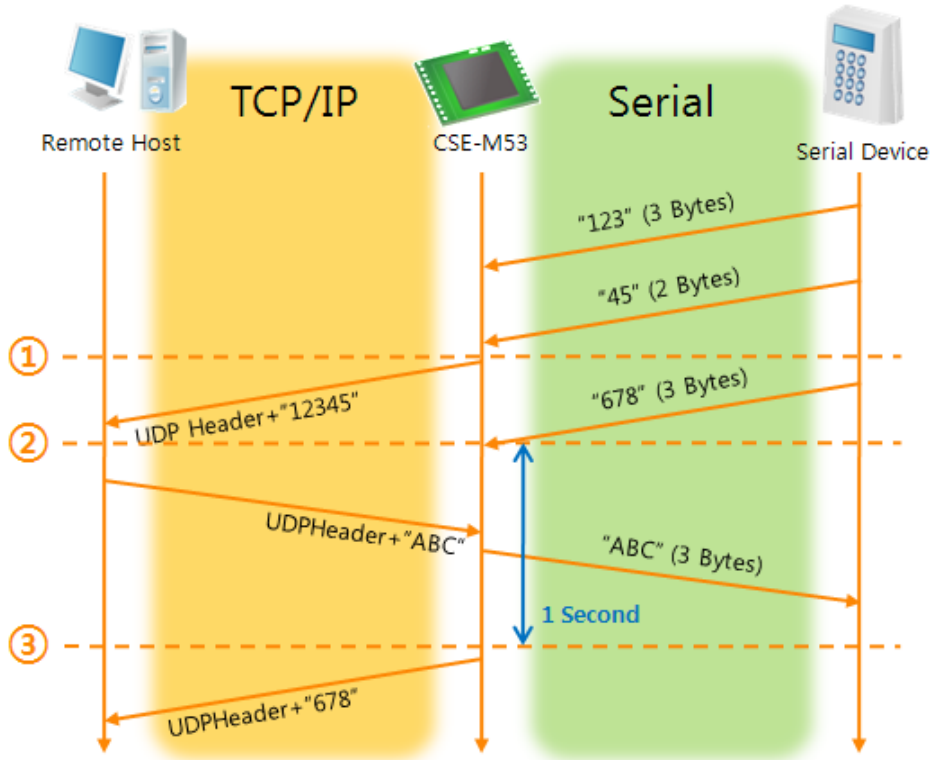

Figure 5-10 time chart for block size is 5 bytes and data frame is 1s

Points	States
~	CSE-M53 is receiving data from the serial port
①	CSE-M53 Sends 5 bytes as one block based on the [Block Size]
~	Serial device sends data "678" to the CSE-M53
②	Data "678" has arrived
~	CSE-M53 sends data from the remote host to the serial device
③	1 second has passed
~	CSE-M53 sends data "678" based on the [Data frame]

Table 5-14 states of each points

- Dynamic Update of Peer host

  This is a function that CSE-M53 automatically sets its peer host with information of the last packet which is received from network. In the packet, the source address and port number is used.

Parameters	Values
Peer Address	0 (None)
Peer Port	0

Table 5-15 setting for [dynamic update of peer host] function

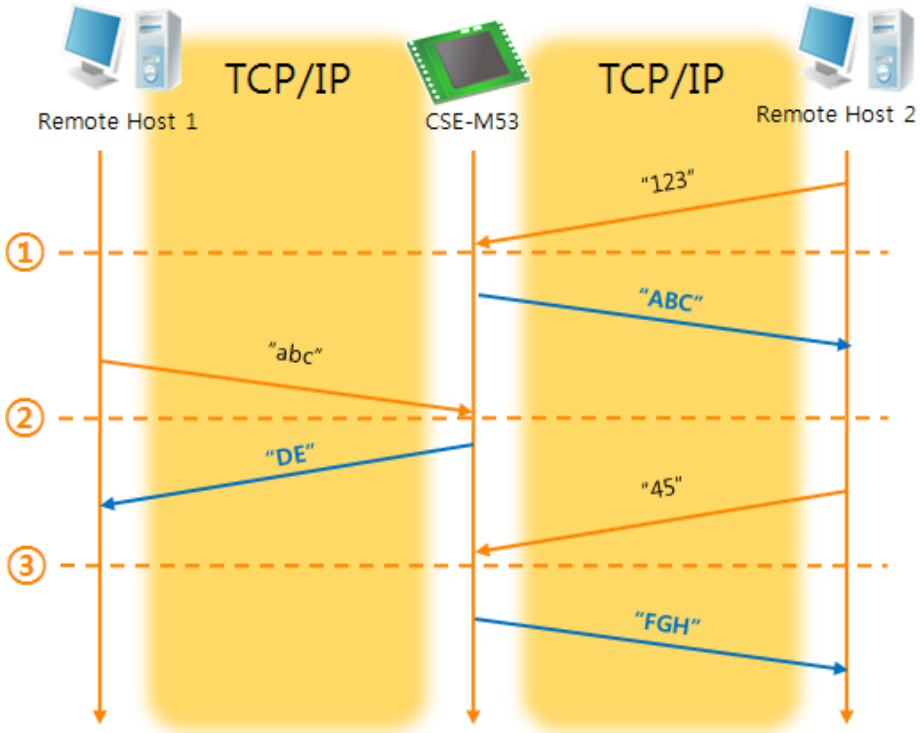

Figure 5-11 time chart for [dynamic update of peer host]

Points	States
~	Remote host 2 sends data to CSE-M53
①	CSE-M53 sets host 2 to peer host
~	Remote host 1 sends data to CSE-M53
②	CSE-M53 updates host 1 to peer host
~	Remote host 2 sends data again to CSE-M53
③	CSE-M53 updates host 2 to peer host
~	CSE-M53 can communicate with remote host 2

Table 5-16 states of each points

☞ ***The data "ABC", "DE", "FGH" are from the serial port of CSE-M53 in the above figure.***

6 System Management

6.1 Upgrading Firmware

6.1.1 Firmware

Firmware is a type of software for operation of CSE-M53. If there are needs for adding function or fixing bugs, the firmware is modified and released. We recommend that users keep use the latest released firmware.

6.1.2 Processes

- Downloading the latest released firmware
  Download the newest firmware file. We update our homepage when a new firmware is released. You can find it on our website.
- Entering ISP mode
  Enter ISP mode to download firmware file to CSE-M53.
- Run a TFTP client and ready to send the F/W file
  Run a TFTP client program. ezManager is equipped the client program. Click the [Change F/W / HTML] button.

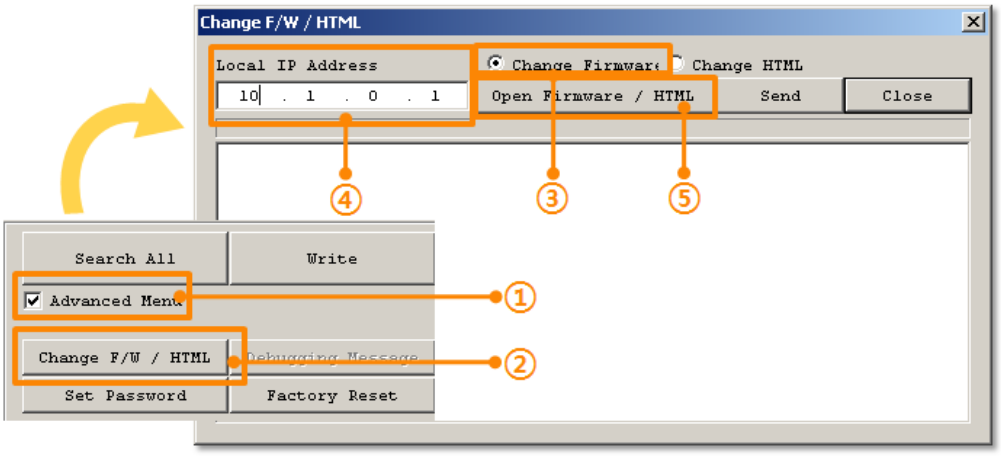

Figure 6-1 running TFTP client

① Check the [Advanced Menu] check box
② Click the [Change F/W / HTML] button to run TFTP client
③ Select the [Change Firmware] radio button
④ Input the IP address of CSE-M53 to the [Local IP Address] text box
⑤ Press the [Open Firmware / HTML] button and choose the firmware file

- Checking firmware file and Sending

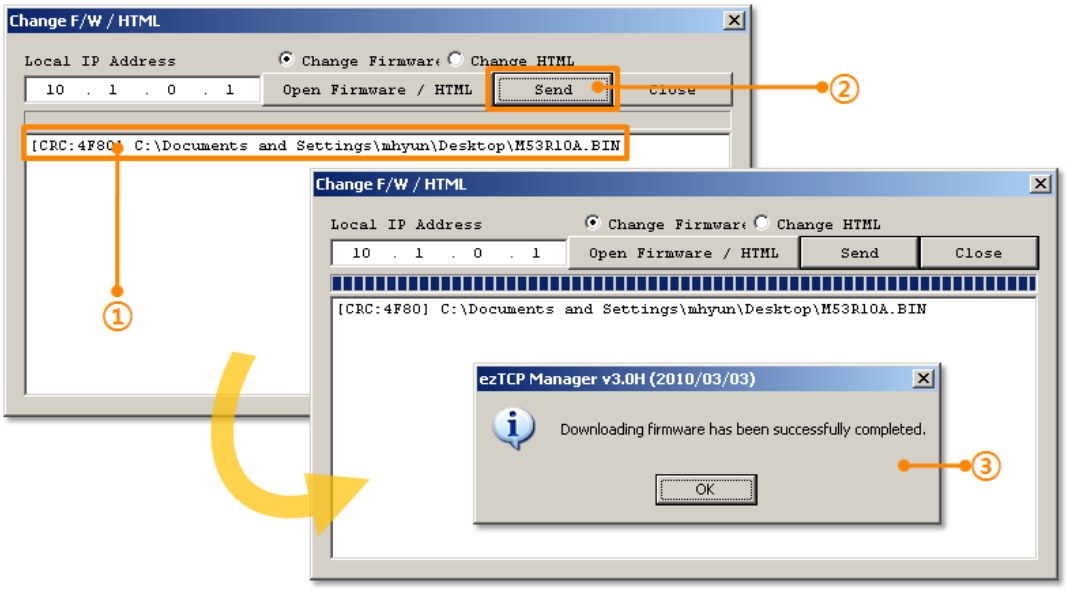

Figure 6-2 sending firmware file

① Check if the name and path of the firmware file are correct

② Click the [Send] button

③ Confirm the completed message

6.2 Status Monitoring

6.2.1 Using TELNET

Once the [TELNET] option is activated, users can remotely log in to CSE-M53. If a password is set, users should input the password.

After then, messages from CSE-M53 appear like the below figure.

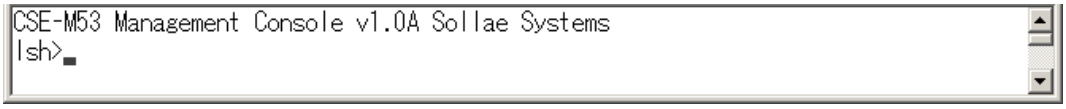

Figure 6-3 log in to CSE-M53 on TELNET

Followed commands let users check each state.

Command	Option	Description	Usage
st	net	Network Status	lsh>st net
	sio	Serial Port Status	lsh>st sio
	uptime	System Uptime	lsh>st uptime
sc	[op1][op2]	Session Control	lsh>sc com1 close

Table 6-1 Commands for checking states

- st net

  "st net" command displays present network states of all sessions.

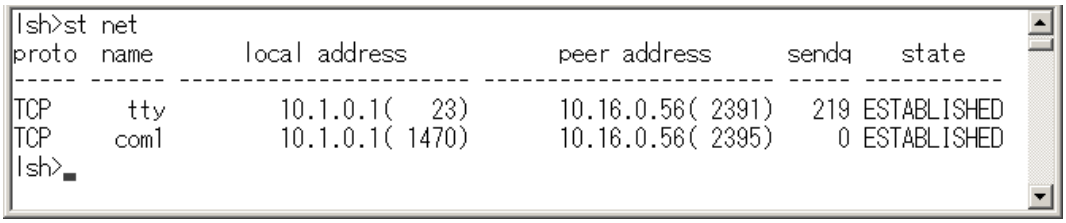
lsh>st net
proto name local address peer address sendq state
TCP tty 10.1.0.1(23) 10.16.0.56(2391) 219 ESTABLISHED
TCP com1 10.1.0.1(1470) 10.16.0.56(2395) 0 ESTABLISHED
lsh>

Figure 6-4 "st net" command

- st sio

  "st sio" command displays the number of bytes for the serial port.

```
lsh>st sio
port fmax rbmax rxbuf txbuf  rx_count   tx_count
---- ---- ----- ----- ----- ---------- ----------
com1    1     0     0     0          8         72
lsh>
```

Figure 6-5 "st sio" command

- st uptime

  "st uptime" command shows amount of time since CSE-M53 boots up.

```
lsh>st uptime
00:04:21.79 up 0 days
lsh>
```

Figure 6-6 "st uptime" command

- sc

  "sc" command is used when users close a session. [op1] means the name of session, and [op2] should be "close".

```
lsh>sc com1 close
com1: closed
lsh>
```

Figure 6-7 "sc" command

☞ ***In case of the "sc" command you should use only small letters.***

6.2.2 Using ezManager

Status of CSE-M53 can be monitored by [Status] button on ezManager. By using the [Refresh Every 1 Second] option in the status window, the status is automatically updated in every second.

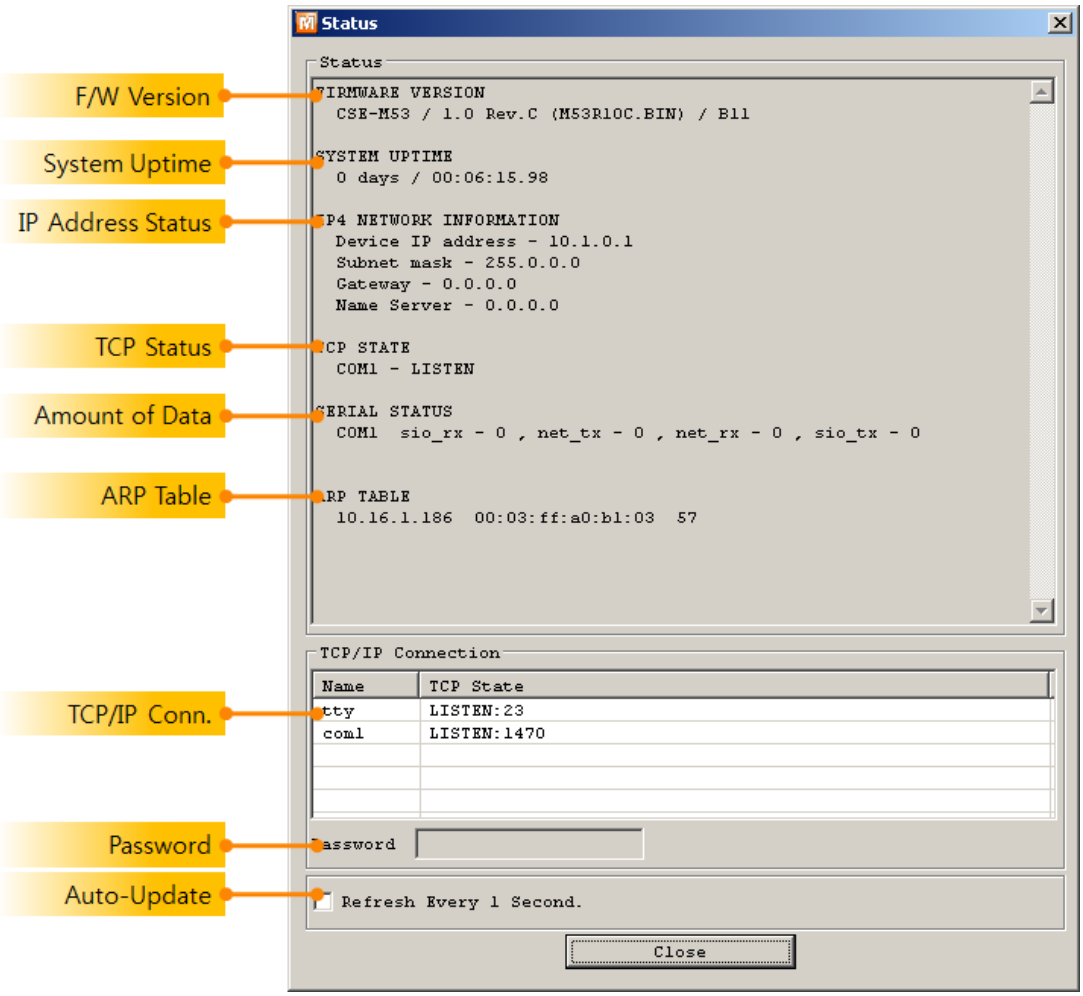

Figure 6-8 status window of ezManager

- FIRMWARE VERSION

  The name of model name and the version of firmware are displayed here.

- SYSTEM UPTIME

  Amount of time is displayed since CSE-M53 boots up.

- IP4 NETWORK INFORMATION

  All information about related items with IP Address is shown here. It works even if the IP address is assigned from DHCP or PPPoE.

- TCP STATE

  TCP status of each port is shown this section.

Message	Description
LISTEN	listening TCP connection
CLOSE	TCP connection is closed
SYN_SENT	Send "SYN" segment to make TCP connection
ESTABLISHED	When TCP connection is established
N/A	In UDP mode

Table 6-2 TCP STATE

- SERIAL STATUS

  Amount of data in every buffer is displayed. The unit is byte.

Buffer	Description
sio_rx	The number of data which is received from the COM port
net_tx	The number of data which is sent to the remote host
net_rx	The number of data which is received from the remote host
sio_tx	The number of data which is sent to the COM port

Table 6-3 SERIAL STATUS

- ARP TABLE

  This part shows ARP table on CSE-M53. When TCP connection is established or UDP data communication is performed, the information of IP and MAC address is automatically stored in the ARP table. This information is held for 1 minute. When 50 seconds is passed, CSE-M53 starts broadcasting the ARP packet again. If there is no response until the time is 0, the information is removed. If there is response, the time is updated 60 seconds again.

- TCP/IP Connection

  In this section, the same information with TCP STATE is displayed with IP address and port number. A difference is that users can terminate TCP connection. When right click on a session, a small pop-up window is created.

- Password

  This text box is activated when CSE-M53 has a password. If users want to close TCP connection with right click of mouse on the session, this password has to be correctly filled.

- Refresh Every 1 Second.

  If this option is checked, ezManager send query in every second.

6.2.3 Debugging Message

By using [Debugging] option, users can receive debugging messages from CSE-M53 on the network.

- Setting debugging option

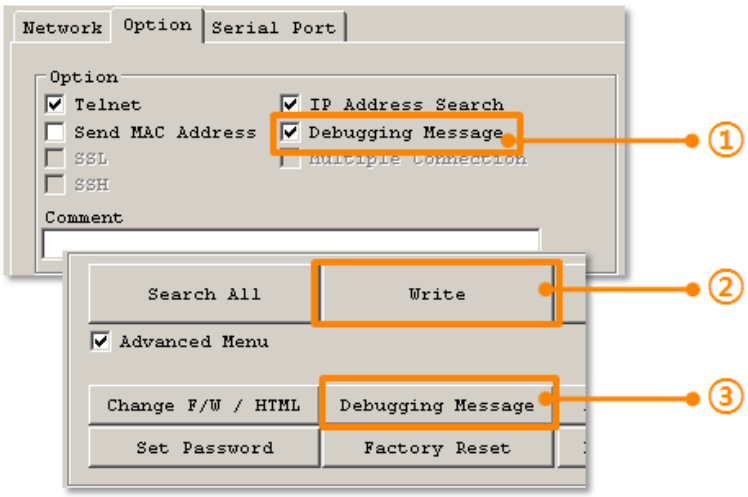

Figure 6-9 setting debugging option

① Check the [Debugging Message] option

② Press the [Write] button

③ After check the [Advanced Menu], click the [Debugging Message] button. And then, the debugging message window is shown on your screen like figure 6-10.

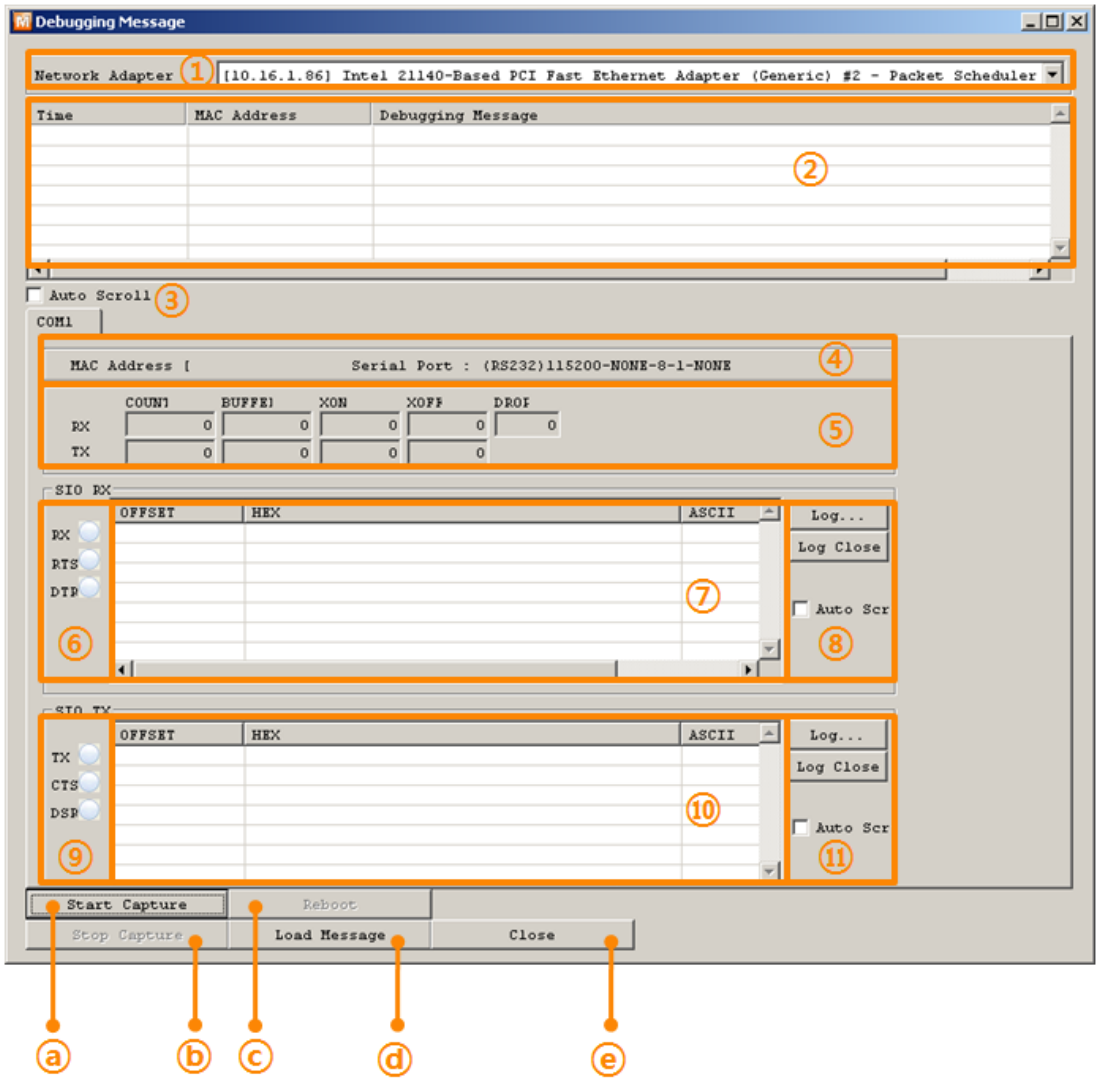

Figure 6-10 debugging message window

① Network Adapter

② Place for listing received debugging messages from CSE-M53 over the network

③ Auto update to display the latest captured file on the screen of ②

④ MAC Address and Serial port Information of a selected message

⑤ Amount of received or dropped data and XON/OFF signals

⑥ Serial port's receiving status with LED interface

⑦ Place for listing received data from the serial port

⑧ Buttons for saving, closing and clearing a log file including an auto scroll option

⑨ Serial port's transmitting status with LED interface

⑩ Place for listing sent data to the serial port

⑪ Buttons for saving, closing and clearing a log file including an auto scroll option

ⓐ To start capturing debugging messages from CSE-M53

ⓑ To stop capturing debugging messages from CSE-M53

ⓒ [Reboot] button is for software rebooting

ⓓ [Load Message] is for loading a debugging log file to display

ⓔ Closing debugging message window

☞ ***If you have problems with communication or connection, it can be helpful for us that you capture the debugging messages and send us to the file.***

☞ ***When you use [Debugging Message] function, it can cause network traffic because the messages are broadcasted to whole network. If you don't use it anymore, you should uncheck the function.***

7 Additional Functions

7.1 Security

7.1.1 Restriction of Access (ezTCP Firewall)

On the [Option] tab of ezManager, users can set restriction of access function with filtering MAC and IP address.

- Allowed MAC Address

  If this option has a value of MAC address, the device which has the MAC address is only permitted to access.

- Allowed IP Address

  This is for qualifying hosts with IP address or range of IP address. The range is defined by multiplying [IP address] and [Network Mask] in bit unit.

- Examples

IP Address	Network Mask	Allowed IP Address Range
10.1.0.1	255.0.0.0	10.1.0.1 ~ 10.255.255.254
10.1.0.1	255.255.255.0	10.1.0.1 ~ 10.1.0.254
192.168.1.4	255.255.255.255	192.168.1.4

Table 7-1 examples of defining allowed IP range

- Apply to ezManager

  [Apply to ezManager] is for applying above two restrictions to ezManager functions like [Search], [Read], [Write] and etc.

7.1.2 Setting Password

A password can be used for protecting CSE-M53 from TELNET login or changing environmental parameters by hosts which are not qualified. The maximum length is 8 bytes of Alphabet or number.

☞ ***When you want to revoke all of these restrictions, operate CSE-M53 as ISP mode. In the mode, all restrictions are removable and communication with ezManager is revoked.***

7.2 Notify IP Change

CSE-M53 can be TCP server even though it assigned IP address automatically. Using [Notify IP Change] function, CSE-M53 sends its IP address with the host name to the designed server. There are 3 types- DDNS, TCP and UDP- for this service.

- Dynamic Domain Name Service (DDNS)
  CSE-M53 supports DDNS service offered by DynDNS. Therefore, you have to make an account and create host names on the website of DynDNS before you use.

☞ ***All about service usage of an account could be changed according to the policy of DynDNS.***

☞ ***Homepage of DynDNS: http://dyn.com/***

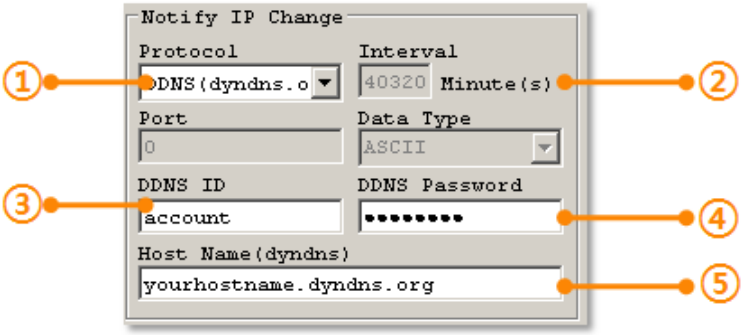

Figure 7-1 setting DDNS

① Select the [DDNS(dyndns.org)]
② 40,320 is a fixed value
③ Input the ID of DDNS account
④ Input the password of the account
⑤ Input a host name which you create on your account

- TCP/UDP
  In case you have an own server and want to manage the information about changed IP addresses, you allowed used TCP/UDP for using this option. The [Data Type] can be selected as ASCII or hexadecimal, and the [Interval] is available on configuration.

7.3 Sending MAC Address

[Sending MAC Address] is a function that CSE-M53 sends its MAC address to the remote host right after the connection is established. By using this function, a server can identify multiple devices with the information.

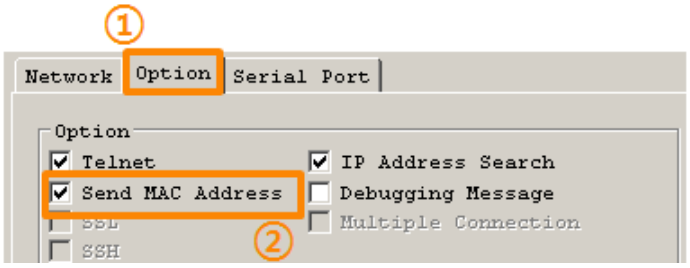

Figure 7-2 setting of Sending MAC Address function

① Move to the [Option] tab.

② Check the [Send MAC Address] option.

7.4 TELNET COM port Control Option (RFC 2217)

This option is for sending and receiving serial port states between two devices. Users can send and receive control signals like RTS/CTS when the states are changed.

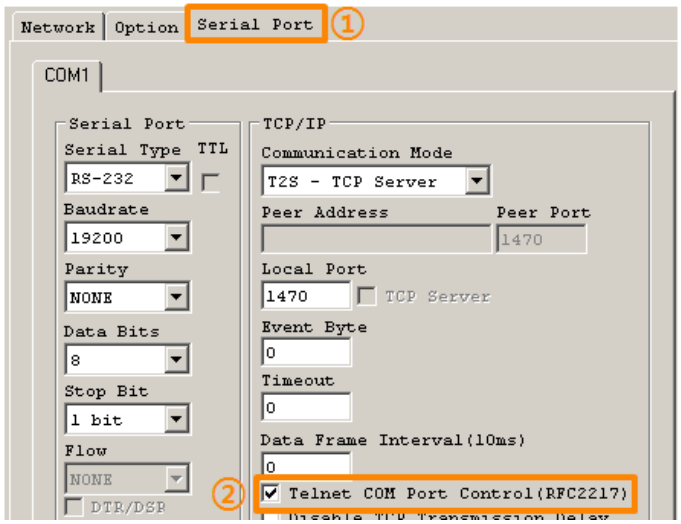

Figure 7-3 setting of TELNET COM Port Control option

① Move to the [Serial Port] tab.

② Check the [Telnet COM Port Control (RFC2217)] option.

☞ ***If you want details about the [TELNET COM port Control Option] and [Sending MAC Address], please refer to the documents on the [Download] >> [Technical Document] of our website.***

8 Self-Test in Trouble

When users are in trouble with CSE-M53, make sure all the followed steps first.

8.1 Searching problem with ezManager

- Confirming types of configuration utility
  CSE-M53 can be configured by ezManager.
- Stopping Firewall operation
  Firewalls of personal computer or network block broadcast packets. Stop all the firewalls before searching CSE-M53

☞ *Most of vaccine programs have firewall functions so it can cause some trouble to search CSE-M53. Stop these programs before the searching.*

- Stable supply of the power
  Check if the power is supplied continually. If the power is constantly supplied, the LED on the CSE-M53's body blinks slowly.
- Connection with the network
  Make sure that the network connection is fine including Ethernet cable. In this step, we recommend that users connect CSE-M53 with PC directly or in the same network hub.
- Checking options of restriction
  In case that restriction of access is activated, the communication with ezManager can be impossible. When users are in this situation, make CSE-M53 operate in ISP mode.

8.2 Connection Problem over TCP/IP

- Checking parameters related with TCP/IP

  When CSE-M53 has a private network IP address, personal computer's IP address has to be the same sub network. Check if the IP address and local port number are correct. In case of a fixed IP address, the subnet mask, gateway IP address and DNS IP address should be configured.

TCP Server side	TCP Client side
Local IP Address, Local Port, Subnet Mask, Gateway IP Address, DNS IP Address, DDNS option	Local IP Address, Peer Address, Peer Port, Subnet Mask, Gateway IP Address, DNS IP Address,

Table 8-1 major parameters related with TCP/IP

- PING Test

  Confirm the connection over the network by PING test. If the CSE-M53 doesn't send any reply from the request, check the network environment.

- Firewall

  In case the networks which need strong security, the access may be denied by their firewall. Under this circumstance, users should ask the person in charge of their network to release ports which will be used. (Ex: TCP 1470, UDP 50005)

- Operation Mode

  TCP connection is not possible when CSE-M53 is operating in the ISP or Serial Configuration mode.

- Communication Mode

  To make TCP connection, both a server and client should exist. If there are only servers or clients, TCP connection can't be established.

- ezTCP Firewall

  When users set the ezTCP firewall with MAC and IP address, any hosts can't be reachable to it except for the hosts which have the allowed MAC and IP address. Inactivate the option or check the setting is correct.

- Checking the TCP status

  TCP is a protocol connected one to one without multiple connection function. Because of this, if a device is on TCP connection, other requests are denied. If users are in this situation, check the network status by connecting on TELNET or using ezManager.

8.3 Data Communication Problem on the Serial

- Connection of Pins

  Check if the connection of each pin is right. Using cables, users choose the right type of cable which is suitable for the device. Transmit Data (TXD) pin should be connected with Receive Data (RXD) pin. Look at the figure 8-1.

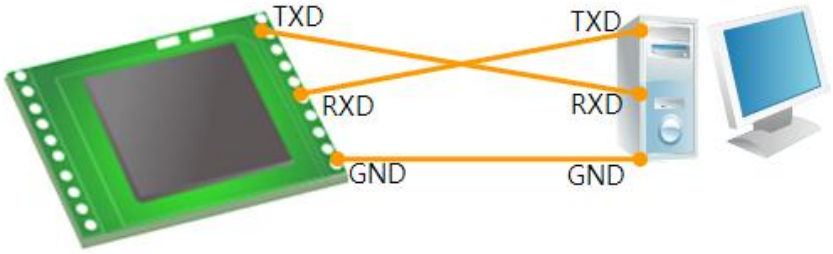

Figure 8-1 RS232 connection

- Setting parameters

  Check if all the serial port parameters like Baud Rate, Data bit, Stop bit and Parity are properly set.

☞ ***Contact us if you have any questions about above steps or our products.***

9 Related Material

9.1 Technical Documents

You can find the technical documents at our website.

- DataSheet
- IP Change Notification(DDNS)
- Sending MAC Address function
- TCP Server/Client mode
- Telnet COM Port Control Option
- etc

9.2 Smart phone Application

- ezManager(IOS)
- ezManager(Android)
- TCP/IP Client(Android)

10 Technical Support and Warranty

10.1 Technical Support

If you have any question regarding operation of the product, visit Customer Support FAQ corner and the message board on Sollae Systems' web site or send us an email at the following address:

- E-mail: support@eztcp.com
- Website Address for Customer Support: http://www.eztcp.com/en/support/

10.2 Warranty

10.2.1 Refund

Upon the customer's request to refund the product within two weeks after purchase, Sollae Systems will refund the product.

10.2.2 Free Repair Services

For product failures occurring within two years after purchase, Sollae Systems provides free repair services or exchange the product. However, if the product failure is due to user's fault, repair service fees will be charged or the product will be replaced at user's expense.

10.2.3 Charged Repair Services

For product failures occurring after the warranty period (two years) or resulting from user's fault, repair service fees will be charged and the product will be replaced at user's expense.

11 Precaution and Exemption from Liability

11.1 Precaution

- Sollae Systems is not responsible for product failures occurring due to user's alternation of the product.
- Specifications of the product are subject to change without prior notice for performance improvement.
- Sollae Systems does not guarantee successful operation of the product if the product was used under conditions deviating from the product specifications.
- Reverse engineering of firmware and applications provided by Sollae Systems is prohibited.
- Use of firmware and applications provided by Sollae Systems for purposes other than those for which they were designed is prohibited.
- Do not use the product in an extremely cold or hot place or in a place where vibration is severe.
- Do not use the product in an environment in which humidity is high or a lot of oil exists.
- Do not use the product where there is caustic or combustible gas.
- Sollae Systems does not guarantee normal operation of the product under the conditions a lot of noise exists.
- Do not use the product for a purpose that requires exceptional quality and reliability relating to user's injuries or accidents – aerospace, aviation, health care, nuclear power, transportation, and safety purposes.
- Sollae Systems is not responsible for any accident or damage occurring while using the product.

11.2 Exemption from Liability

11.2.1 English version

In no event shall Sollae Systems Co., Ltd. and its distributors be liable for any damages whatsoever (including, without limitation, damages for loss of profit, operating cost for commercial interruption, loss of information, or any other financial loss) from the use or inability to use the CSE-M53 even if Sollae Systems Co., Ltd. or its distributors have been informed of such damages.

The CSE-M53 is not designed and not authorized for use in military applications, in nuclear applications, in airport applications or for use in applications involving explosives, or in medical applications, or for use in security alarm, or for use in a fire alarm, or in applications involving elevators, or in embedded applications in vehicles such as but not limited to cars, planes, trucks, boats, aircraft, helicopters, etc..

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Sollae Systems Co., Ltd. and its distributors entire liability and your exclusive remedy shall be Sollae Systems Co., Ltd. and its distributors option for the return of the price paid for, or repair, or replacement of the CSE-M53.

Sollae Systems Co., Ltd. and its distributors disclaim all other warranties, either expressed or implied, including, but not limited to, the implied warranties of merchantability and fitness for a particular purpose, with respect to the CSE-M53 including accompanying written material, hardware and firmware.

11.2.2 French version

- Documentation

La documentation du CSE-M53 est conçue avec la plus grande attention. Tous les efforts ont été mis en œuvre pour éviter les anomalies. Toutefois, nous ne pouvons garantir que cette documentation soit à 100% exempt de toute erreur. Les informations présentes dans cette documentation sont données à titre indicatif. Les caractéristiques techniques peuvent changer à tout moment sans aucun préavis dans le but d'améliorer la qualité et les possibilités des produits.

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Tous les CSE-M53 sont testés avant expédition. Toute utilisation en dehors des spécifications et limites indiquées dans cette documentation ainsi que les court-circuit, les chocs, les utilisations non autorisées, pourront affecter la fiabilité, créer des dysfonctionnements et/ou la destruction du CSE-M53 sans que la responsabilité de Sollae Systems Co., Ltd et de ses distributeurs ne puissent être mise en cause, ni que le CSE-M53 puisse être échangé au titre de la garantie.

- Rappel sur l'évacuation des équipements électroniques usagés

Le symbole de la poubelle barré présent sur le CSE-M53 indique que vous ne pouvez pas vous débarrasser de ce dernier de la même façon que vos déchets courants. Au contraire, vous êtes responsable de l'évacuation du CSE-M53 lorsqu'il arrive en fin de vie (ou qu'il est hors d'usage) et à cet effet, vous êtes tenu de le remettre à un point de collecte agréé pour le recyclage des équipements électriques et électroniques usagés. Le tri, l'évacuation et le recyclage séparés de vos équipements usagés permettent de préserver les ressources naturelles et de s'assurer que ces équipements sont recyclés dans le respect de la santé humaine et de l'environnement. Pour plus d'informations sur les lieux de collecte des équipements électroniques usagés, contacter votre mairie ou votre service local de traitement des déchets.

12 History

Data	Version	Comments	Author
2009.11.05	1.0	○ Created	
2009.12.01	1.1	○ The form of History has been changed – Adding Author ○ Description of "sc" command has been changed. ○ Description of debugging message has been changed. ○ Maximum value of Event byte has been added. ○ Operating/Storage Temperature have been changed. ○ Some of hyperlinks have been removed. ○ Description of "Sending MAC Address and RFC2217 option have been changed.	Roy LEE
2010.01.06	1.2	○ Some expressions including version have been modified.	Roy LEE
2010.03.22	1.3	○ Some figures and expressions have been modified.	Roy LEE
2010.04.06	1.4	○ the application circuit has been modified.	Roy LEE
2010.05.20	1.5	○ Description of RST-pin has been added in the Table 1-2.	Roy LEE
2010.06.25	1.6	○ Maximum value of the [Event Bytes] has been corrected.	Roy LEE
2011.03.24	1.7	○ Figures about ezManager have been updated. ○ A term has been replaced in UDP. (Event Byte->Block Size) ○ The link of support page has been corrected. ○ Information about dimensions of EVB has been added.	Roy LEE
2011.12.16	1.8	○ Caution about service using of DynDNS has been added	Lisa Shin
2012.06.28	1.9	○ Change the domain name to 'www.ezTCP.com' ○ Extend the warranty period to two years ○ Remove description about PPPoE and DHCP	Lisa Shin
2013.05.15	2.0	○ Add Exemption from Liability contents ○ Add Related Material contents ○ Modify some expressions	Lisa Shin